

HANDWORK FOR SCHOOLS

W. R. DEAN
AND
H. JOLLY

HUMPHREY MILFORD
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CATHEDRAL BUILDINGS, MELBOURNE

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HANDWORK FOR SCHOOLS

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HANDWORK FOR SCHOOLS

BY

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WITH A FOREWORD BY

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With 61 Pages of Illustrations

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OTHER BOOKS BY THE SAME
AUTHORS

Drawing with Pastels

Perspective and Geometrical Drawing

FOREWORD

THE contents of this book are based mainly on the art and handwork sections in the revised curriculum for primary schools, and will give a lead to teachers desiring to take full advantage of the extra time that is now allotted to the subject. To give teachers a greater freedom of choice, many additional forms of handwork are included, with very clear explanatory illustrations and with detailed instructions in the text.

The value of art and handwork as a vital and necessary part of any sound educational course is now generally recognized, for these subjects gradually train the eye and the mind to a fine appreciation of beauty, of form, and of construction, and thus lead pupils to a right understanding of what constitutes good work.

Though in all schools children will practise handwork as a useful occupation for their leisure time and for the development of an aesthetic sense, yet the exercises undertaken should always be related to the work and interests of the world around them. In an industrial area the handwork taught may form a foundation for more specialized work in a junior technical school, while in a country centre it may be linked with the activities of the Young Farmers' Clubs and with work on the farm.

A pleasing feature of this book is the effective use of inexpensive and even of waste materials, easily obtained in any community. It shows how many simple and useful articles can be made with clay, plasticine, paper, cardboard, wool, raffia, cane, thread, hessian, wood, leather, wire, and metal. The tools required have been reduced to a minimum. Inventiveness has been stimulated by showing how these may be fashioned often from scrap materials and from discarded utensils. Think of the added joy with which the young craftsman will regard work that has been done not only by his own hands, but with tools that he himself has devised specially for the purpose.

The authors have endeavoured to raise handwork from the former level of manual exercises to that of creative applied art. With appropriate decoration every piece of handwork should be so attractive that it does not find its resting place in the bottom of the school cupboard, but will be the valued work of the pupil and find a welcome in the home. Further, the pupil should be encouraged to bring his hobby work from home to the teacher for helpful criticism, and so bridge the gap between formal class instruction and the expression of creative power in the pupils' leisure.

J. McRAE,
Director of Education.

Victoria, 28/3/34.

CONTENTS

	Page
FOREWORD	vii
INTRODUCTION	xiii
MODELLING AND CARVING—	
Modelling—	
Materials and Tools	1
Grade I Work	1
Grade II Work	2
Grade III Work	3
Grade IV Work	3
Grade V Work	5
Pressed Cement	6
Carving	7
PATTERN AND DECORATION—	
Lettering	8
PAPER AND CARDBOARD HANDWORK—	
Paper Cutting, Tearing and Building	15
Designs for Book Covers	18
Building with Paper	20
Building with Match Boxes and Matches	24
Building with Cardboard	25
Lamp Shades	27
Paper Mosaics	30
Papier Mâché	32
Bookmaking	34
PRINTED DECORATIONS—	
Stick Printing	40
Potato Printing	42
Cork Printing	42
Linoleum Block Printing	44
Stencilling	48
WEAVING—	
Weaving with Paper	52
Raffia Work	52
Weaving with Raffia	53
Plaiting	54
Basketry	56
Tablet Weaving	61
Weaving on a Hand Loom	64

HANDWORK IN WOOD—		Page
The Woodwork Room	..	67
Woodwork	.. ..	68
Rustic Work	.. ..	82
Fretwork	.. ..	83
Toymaking	.. ..	86
Chip-Carving	.. ..	88
Methods of Finishing Timbers		91
Methods of Colouring Wood		92
Wood Staining	.. ..	94
Brush Making	.. ..	94
OTHER CRAFTS—		
LEATHERWORK	.. ..	96
SUEDE WORK	.. ..	96
EMBOSSSED LEATHERWORK	.. ..	98
WIRE WORK	.. ..	100
SHEET-METAL WORK	.. ..	104
METAL WORK	.. ..	108

ILLUSTRATIONS

PLATE I—		Opp. Page
Modelling	..	1
PLATE II—		
Coiled Work and Pottery Shapes	..	2
PLATE III—		
Objects and Plant Form	..	4
PLATE IV—		
Historical	....	4
PLATE V—		
Tiles in Pressed Cement		6
PLATE VI—		
Carving		7
PLATE VII—		
Roman Alphabet	..	8
MODELLING—		Page
Cut-outs	.. ..	4
PATTERN AND DECORATION—		
Single Line Capitals, Lower-case Letters and Numerals	.	9
Plant Treatments	.. ..	10
Plant Treatments	.. ..	11
Plant Treatments	.. ..	12
Patterns for Decoration	.. ..	13
Brush Study	.. ..	14

CONTENTS

xi

PAPER AND CARDBOARD HANDWORK—	Page
Paper Cutting, Tearing and Building ..	16
Paper Cut-outs	17
Designs for Book Covers	19
Paper Construction	21
Building with Paper and Cardboard ..	23
Building with Cardboard	25
Building with Match Boxes	26
Cardboard Construction	28
Cardboard Construction	29
Paper Mosaics	31
Papier Mâché	33
School-Paper Cover	35
Bookmaking	37
Bookmaking	39
 PRINTED DECORATIONS—	
Stick Printing	41
Potato and Cork Printing	43
Linoleum Block Printing	45
Linoleum Prints	47
Stencilled Units	49
Stencilled Articles	51
 WEAVING—	
Paper and Raffia Work	55
Raffia and Cane Work	57
Basketmaking	59
Tablet Weaving	63
Hand Loom	65
Hand Loom	66
 HANDWORK IN WOOD—	
Woodwork	69
Woodwork	73
Woodwork	75
Woodwork	77
Woodwork	79
Rustic Work and Wood Joints	81
Fretwork	85
Toymaking	87
Chip-Carving	89
Development of Objects	90
French Polishing	93
Brush Making	95

OTHER CRAFTS—			Page
LEATHERWORK	..	..	97
EMBOSSSED LEATHERWORK	..		99
WIRE WORK	..	..	101
WIRE WORK	..	..	103
SHEET-METAL WORK	..		105
SHEET-METAL WORK	..		107
METAL WORK	..	..	109
METAL WORK	..	..	111

INTRODUCTION

THE introduction of new ideals and aims in education has given more prominence to the value of art and handwork as an essential part of the curriculum of all schools. It is now considered that the hand is quite as important as the brain in the education of the child, in fact the two must be closely allied in order to create an article of beauty and usefulness. The power to see and to appreciate beauty is keener if it is cultivated by skill in handwork, and the hand is enlisted in the service of the mind.

The child must be taught from the beginning that whatever he may choose to make must be made as well as he possibly can. Thought, design, and execution follow in logical sequence if a piece of handwork is completed which has been designed with due regard to beauty, and in that way appreciation of art can be taught by the application of design to every handicraft. When art and handwork are regarded as a means of general education and not merely as a means of obtaining technical skill, they can be of the highest value in correlation with other subjects in the curriculum. Thus history is related to the present by making objects, implements, and utensils used by people of different periods; geography is explained more clearly by means of relief maps and other forms of modelling; literature becomes more real by illustrations in various forms of handwork. In order to help teachers in developing children both in mind and character by expressing their own ideas in some concrete form of handicraft, the making of articles explained in the following pages is closely related to the general life of the school and of the home.

The early chapters on decoration point to nature for inspiration in units of design, and emphasize the fact that an article worth making is worth making attractive to the eye, and that even an elementary knowledge of designing shapes and of combining colours harmoniously makes all the difference between a beautiful article and one with little appeal to good taste and refinement.

This book contains a large number of illustrations, which are drawn in an explanatory way, the authors relying more on the graphical manner of showing tools, material, and methods of working in various media rather than in lengthy written descriptions. Each craft is carried out with simple and easily procured tools and materials, and calls for no more furniture than is usually provided in the ordinary classroom—primitive means perhaps but under the guidance of a good teacher, effective and educational.

A teacher should decide what is possible in the particular circumstances of the school, and then plan a course with a definite aim in view, which must include a consideration of the beauty of form and colour, a sense of neatness and accuracy, together with skill in tools and materials.

The authors in submitting this book to teachers and students hope that their research and effort to bring art and handwork with simple methods into the schoolroom will be welcomed by the teaching profession generally, and that this book will assist to raise the industrial arts and crafts into their true place as an integral part of the educational system.

W.R.D.

H.J.

PLATE I



MODELLING

MODELLING AND CARVING

MODELLING

Materials and Tools—

Clay or plasticine, ruler, half a clothes-peg, wooden skewer, tooth-brush handle, small tins (all shapes), hair pin. The modelling tool shown on page 4 can be made by shaping with a penknife, and finishing off with fine sandpaper. The modelling can be done on a piece of three-ply or thick cardboard about 8 inches square.

The use of clay is recommended, as it can be easily worked into a plastic state during hot or cold weather. Clay can be bought by weight at any local pottery. Two oil drums, with lids, will be convenient to maintain a good supply of plastic clay. After a lesson, roll the clay in lumps as big as a fist, place into one bin, and sprinkle with water. If one bin is retained for used clay, then the contents of the other bin will be ready for use while the clay in the first bin is absorbing the water. The work in clay, when finished, can be allowed to dry. If there are no air bubbles, it can be burnt in a kiln, coloured with water colours, and lacquered.

Grade I

In this grade free modelling is introduced to illustrate nursery rhymes. On Plate I 'Twenty-four blackbirds baked in a pie' is shown. Many forms of pies, tarts, buns, and nests will be suggested, and will give ample scope for several lessons. Clay or plasticine, small pieces of cardboard cut to shape, and matches are used to build up the forms.

Cinderella, the pumpkin, clock, mouse, rat, slipper, lizard, coach, horses, fire-place, etc., will arouse the imagination, and the hands will instinctively give action to the shapes. The fire-place, clock face, and horses' heads and tails are cut out of cardboard. Other nursery rhymes and fairy stories will provide fascinating subjects.

The development of the sphere or ball into objects is shown on page 4. A piece of clay or plasticine is rolled in the palm of the hands, after which a handle, knob, and spout is added to complete the teapot. Other spherical forms can be developed.

The next exercise illustrated is the cutting of the ball or sphere into halves with a piece of string to make a half-lemon or half-orange. The ball can be flattened out by pressing with the fingers, or it can be rolled out with a cylindrical piece of wood (rolling pin), into a thin slab. Shapes are then cut out with tins and made into tarts, Swiss roll, etc.; a house is shaped with a modelling tool; smaller circular pieces are placed together to form a bunch of grapes, to which the stem has been added. Other shapes are placed together to make animal forms (see page 4).

Simple coiled work, illustrated on Plate II, can be correlated with number work in this grade. The clay or plasticine is rolled between the hands or on the board into long threads, which are then twisted to represent numbers, letters, chains, and other objects.

Grade II

In this grade the work will be an extension of the modelling done in Grade I, with illustrations of fairy stories, of reading lessons, and of interesting events.

Object modelling:—The objects will be based on the sphere, such as rubber ball, cricket ball, basket ball, apple, and orange; on the ovoid, such as tip-cat, fish, egg, and acorn; on a combination of the sphere and ovoid, such as pear, lemon, potato, onion, bulb, carrot, and mushroom.

Coiled work:—Objects made with threads of clay or plasticine, as bird's nest, basket, small house, mat, simple toys (cylindrical or conical in shape).

PLATE II



MODELLING

Coiled Work and Pottery Shapes

Grade III

Modelling objects such as fishing floater, fountain pen, bon-bon, whistle, clothes-peg, whip top, bottles, cartridge-case, candles, marrow, lemon, banana, cucumber, tomato, toy-trumpet, tumbler, oil-can, peg-top, ice-cream cone, birthday cap, Chinese lantern, radish, carrot, parsnip, cake of soap, book, loaf of bread, cocoa tin, match box (partly open), pea pod, rose bud, bean pod.

The work in this section should be built up from an outline (Stage I), drawn with pencil or chalk on the background (see the fishing floater, which is shown in three stages on Plate III); then built up to a convenient height (relief) by small pieces of clay or plasticine (Stage II), and finished as shown in Stage III. Other suitable objects are shown on the same page.

Coiled work:—An extension of the work of Grade II, together with simple pottery shapes. Long threads of clay or plasticine are wound around in a spiral form for the base (Plate II), then the sides are gradually built up to the required shape. Many interesting pottery shapes can be made by this process.

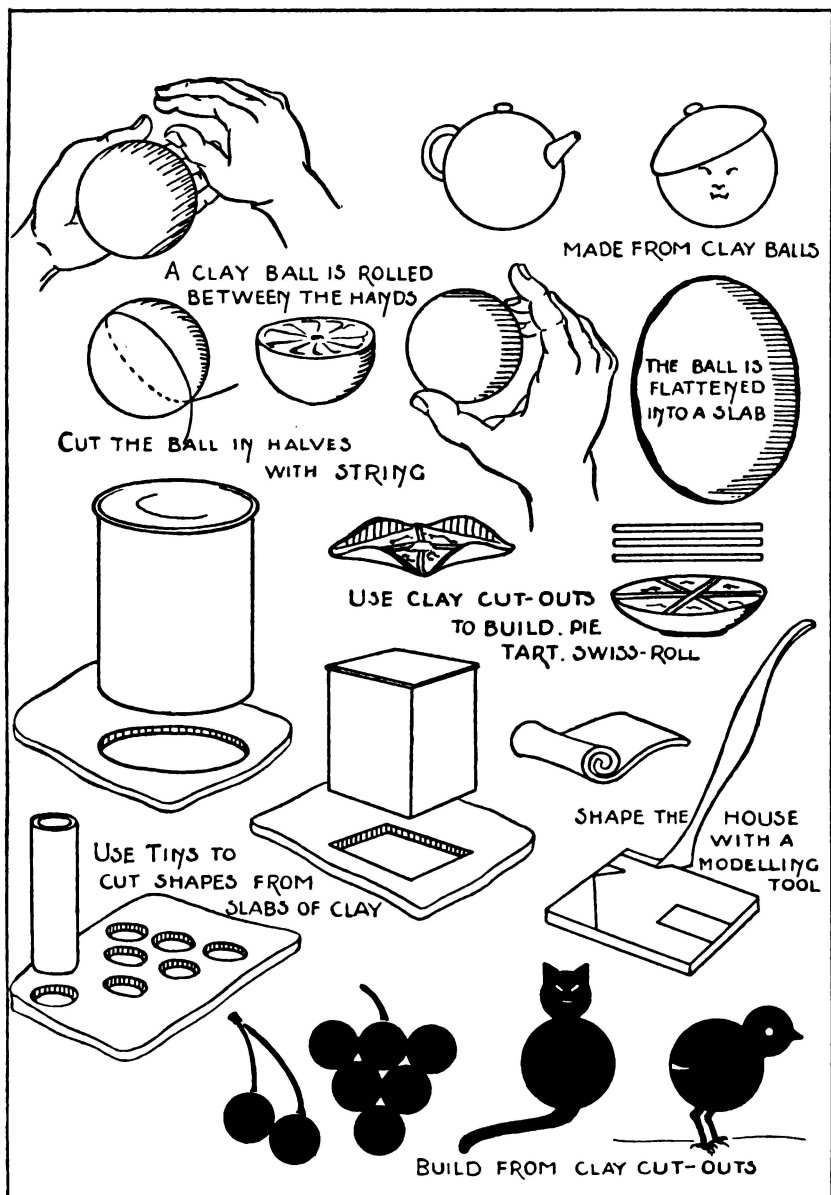
Free modelling:—Objects such as shoe, hat, scout's equipment, carpenter's tools, toys. Correlations with history and geography, and illustrations of stories and events.

Grade IV

Object modelling:—Objects such as a tube of tooth paste, wallet, horse, boat, buckle, slipper, tobacco-pouch; plumbers', blacksmiths', and carpenters' tools.

Natural objects:—Such as pear, quince, pea pod (open), broad bean pod (open), bulbs, simple leaf forms, flowers (simple forms), and bud forms modelled up in the round.

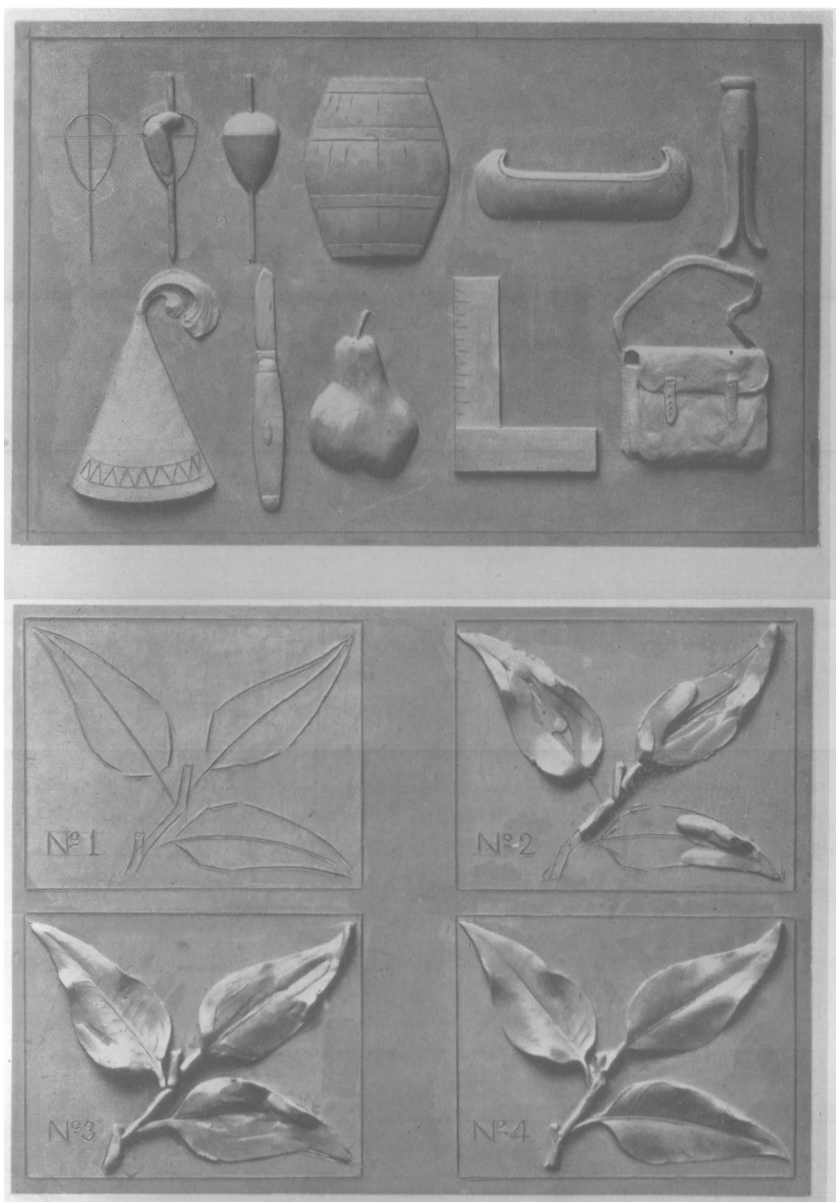
Coiled work:—Pottery shapes built up with threads of clay or plasticine (see Plate II). If the coiled shapes are built up with suitable clay, they can be fired in a kiln, or the surface can be worked with the fingers and tools to obtain a smooth finish. Keep the fingers of the left hand inside the shape while smoothing the outside surface. It is necessary to fire pottery shapes to a temperature of 950 to 1,000 degrees centigrade. Local brick or pottery firms will probably be willing to make a small space available in their kilns to fire the pottery, after which it can be decorated with simple geometric patterns, applied with brush and water colours, or incised with the end of a round stick or pencil. Finish with a coat of lacquer.



MODELLING

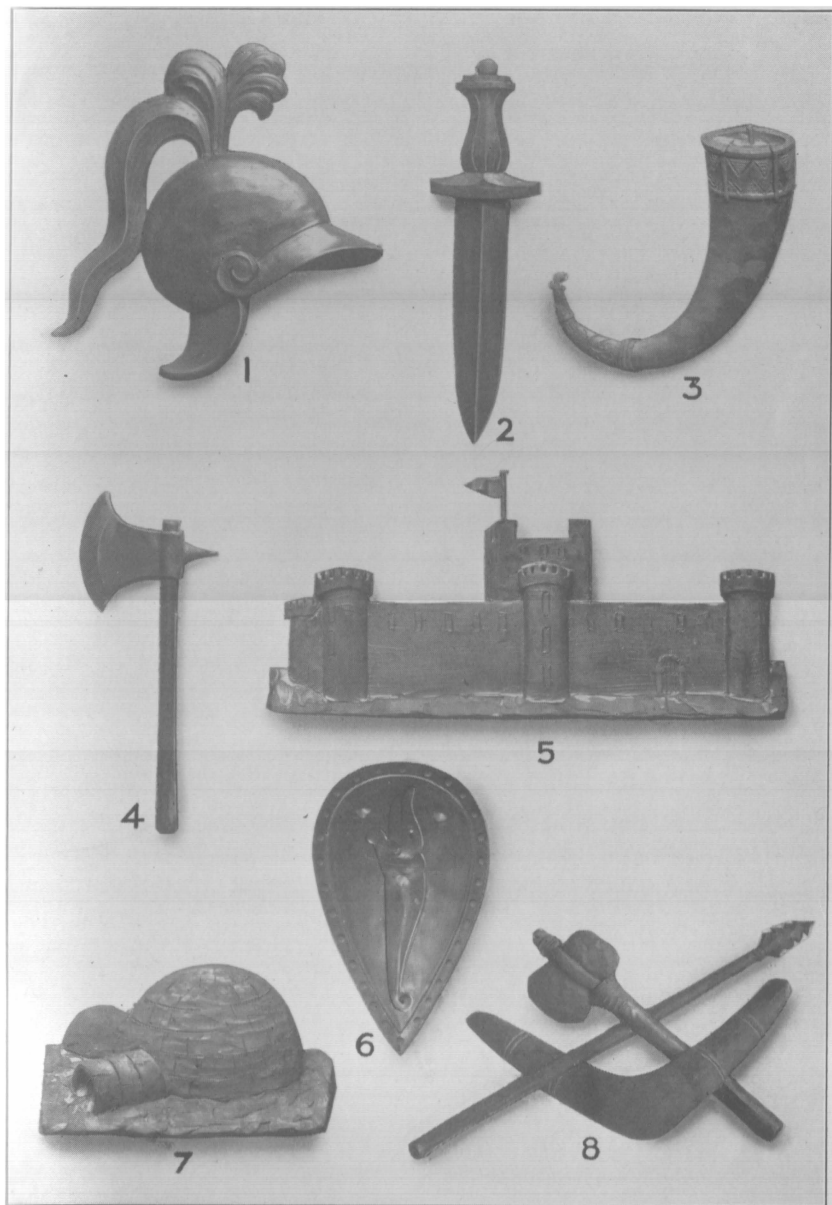
Cut-outs

PLATE III



MODELLING
Objects and Plant Form

PLATE IV



MODELLING
Historical

Illustrative modelling:—Natural forms, birds, insects, and animals modelled in relief. Correlations with history and geography, and illustrations of stories and events. The illustrations on Plate IV are modelled in relief from an outline drawn in pencil or chalk on the background.

No. 1 is a Roman helmet; No. 2, a Roman sword; No. 3, a Saxon drinking-horn; No. 4, a Saxon battle-axe; No. 5, a Norman Castle; No. 6, a Norman shield; No. 7, an igloo or snow house; No. 8, Australian aboriginal weapons—boomerang, spear, and stone axe.

Grade V

Object modelling:—Objects such as boy's cap, knotted handkerchief, shoe, sabot, cup and saucer, candlestick, simple vase forms, railway signal-post, life-belt, anchor, pine-cone, pineapple, walnut, maize cob.

Natural objects:—Such as fruits and vegetables, and leaf, flower, and bird forms.

Illustrative modelling:—Historical: Norman castle, Roman shield, helmet, sword, bugle, standard. Geographical: Maps of countries and various land forms. Natural forms: Extension of the work of Grade IV.

On Plate III is shown a spray of eucalyptus carried out in four stages. In Stage I the outline of the spray is sketched on the background with a pencil; in Stage II the shape and relief (i.e., the respective heights of sections of the leaves above the background) of the forms are blocked in with small pieces of clay or plasticine; in Stage III the relief of the forms is carefully checked by holding the modelling at the level of the eye. Draw the direction of the mid-ribs with the modelling tool, then work the blunt end of the tool down each side of the line, to represent the position of the mid-rib, leaving a narrow ridge for the mid-rib; for Stage 4, sharpen the outline of the leaves with the tool and smooth the surface of the leaves and mid-rib to a finish with the fingers.

PRESSED CEMENT

Materials—

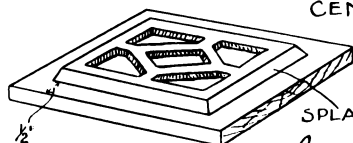
Clay or plasticine for modelling the original model; plaster of paris to make the mould; Portland cement, white cement, sand, oxide colours.

Tiles made from pressed cement are shown on Plate V. The tile is modelled in clay or plasticine, on a small board, which is about $\frac{1}{2}$ inch bigger each way than the tile required. The margin on the board provides for the thickness of the walls of the mould. The form of decoration on the tile may be low relief, incised, or high relief (see diagram). The edges of the tile are splayed, so that the cement tiles will leave the plaster moulds easily.

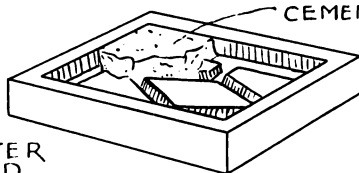
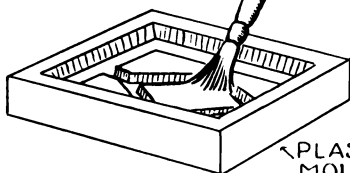
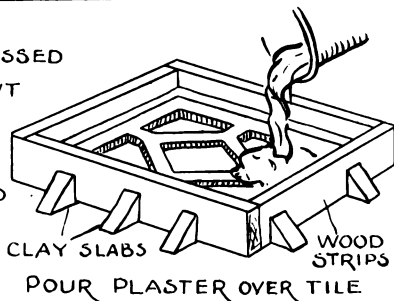
To make the moulds, place strips of wood against the edges of board and support them with small pieces of clay (see diagram). A thin layer of soft clay on the joints at the outside will prevent the liquid plaster from running out. Into a dish, with about a quart of water in it, sieve plaster through the fingers, until the top of a small mound of plaster shows on the surface of the water. (This method will give approximately the amount of plaster required for the water in the dish.) With the hands, mix the contents together quickly and pour over the modelling. By gently shaking the model, air bubbles will be prevented from forming on the surface. Allow the plaster to set, then remove the mould; wash the inside thoroughly with a brush, using soap and water. When the mould is dry, a coating of shellac and methylated spirits is brushed over the surface to prevent the cement from sticking to the mould. The mould is now ready for the cement, which consists of 3 parts of sand to 1 part of cement, with the addition of oxide colour (powder) if desired. The sand, cement, and colour should first be mixed thoroughly when dry. Then add a small quantity of water and mix the contents until the mixture will hold together if squeezed in the hand. Take a small quantity in the hand and press the mixture firmly into the mould; repeat this until the mould is full. A straight edge or ruler is pulled across the top of the mould to remove any surplus cement. After a few minutes the tile is removed from the mould, by covering it with a thin layer of damp sand, then placing a flat board on top, and turning the mould over on a flat surface. The back of the mould is then tapped gently with the fingers (see diagram). Coloured sands, as red, buff, etc., will give interesting results without the use of oxides. If additional colour is required on the surface, a thin coat of prepared cement paint will be satisfactory.

PLATE V

TO MAKE A TILE IN PRESSED CEMENT

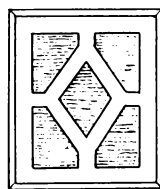
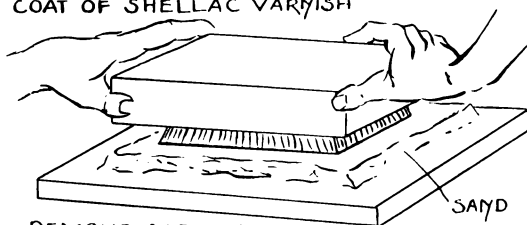


TILE IS MODELLED IN CLAY OR PLASTICINE



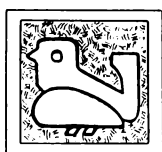
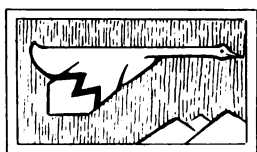
ALLOW PLASTER TO SET
REMOVE CLAY AND APPLY
COAT OF SHELLAC VARNISH

PRESS CEMENT
INTO MOULD



REMOVE MOULD

TILES



LOW RELIEF



INCISED

HIGH
RELIEF



TILES IN PRESSED CEMENT

PATTERN AND DECORATION

LETTERING

On Plate VII is a photograph of an inscription from the Triumphal Arch at Beneventum, built in A.D. 144 in honour of Trajan. The inscription is an excellent example of the Roman alphabet cut in marble, and makes a very decorative panel of lettering; the individual letters are full of character and the spacing is particularly well done. As most of the good modern alphabets are based on the Roman alphabet, it is well to study this prototype as illustrated in the photograph together with the modified Roman alphabet illustrated below on the same page. In this the capitals are correctly proportioned on the monumental type of Roman capitals and an endeavour has been made to preserve the beauty and distinction of the incised character of the letters by the use of thick and thin strokes.

On page 9 the modified Roman alphabet has been reduced to single line capitals and lower-case letters supplying a skeleton alphabet for the convenience of class teaching. Teachers may adopt the method of ruling vertical construction or guiding lines to ensure that beginners keep the letters upright. Special attention should be given to the form and proportion of each letter.

On the same page is a skeleton alphabet containing capitals, lower-case letters, and numerals which are more simple in form and of easier proportions than the Roman. This alphabet is very useful for lettering titles and descriptions on drawings and maps and may also be applied effectively to paper cut-outs, stencilling, leatherwork, stickprinting, and fretwork.

The art of using an alphabet decoratively is to letter freely and accurately, giving due consideration to the shape of each letter and to the spacing of both letters and words. The beauty of lettering is dependent on character and readableness.



A B C D E
F G H I J K
L M N O P
Q R S T U &
V W X Y Z

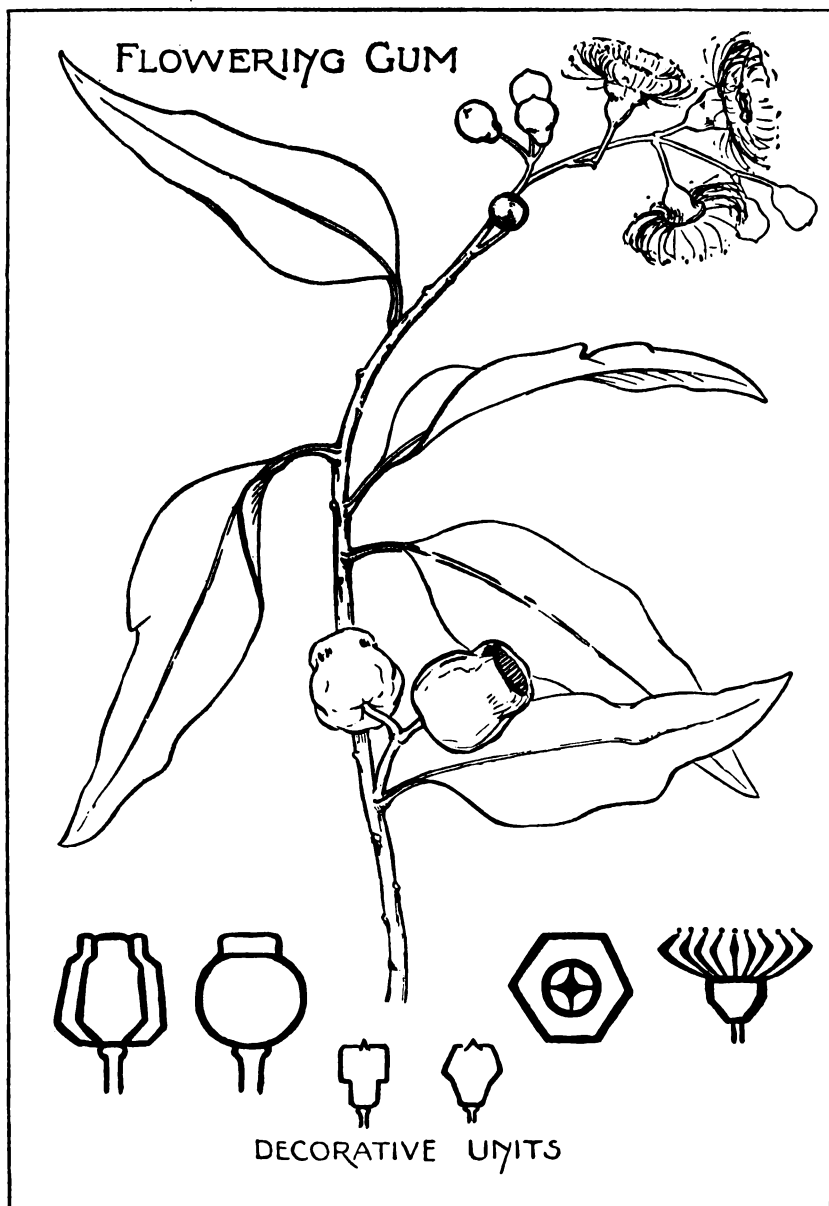
A B C D E F G H I J K
L M N O P Q R S T U
V W X Y Z

a b c d e f g h i j k l m n o p q
r s t u v w x y z

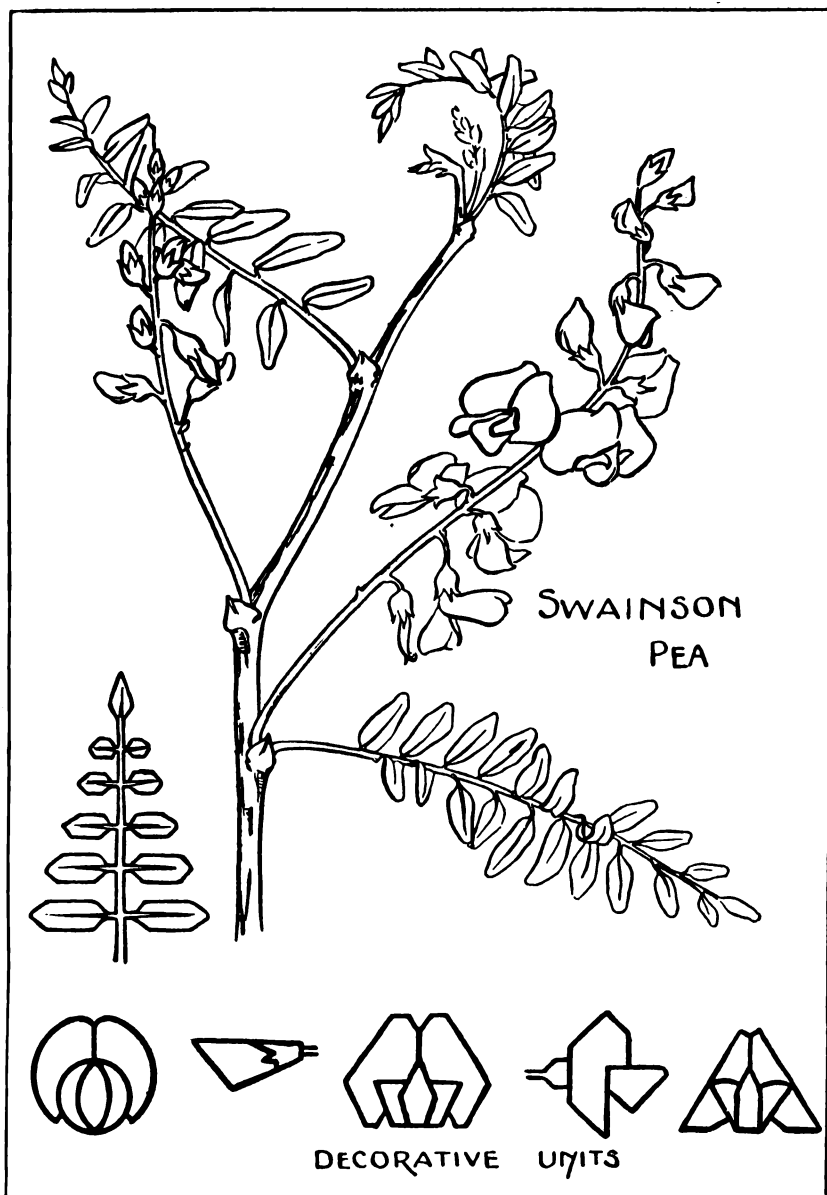
A B C D E F G H I J K L
M N O P Q R S T U V
W X Y Z &

a b c d e f g h i j k l m n o p q r s t
u v w x y z · 1 2 3 4 5 6 7 8 9 0

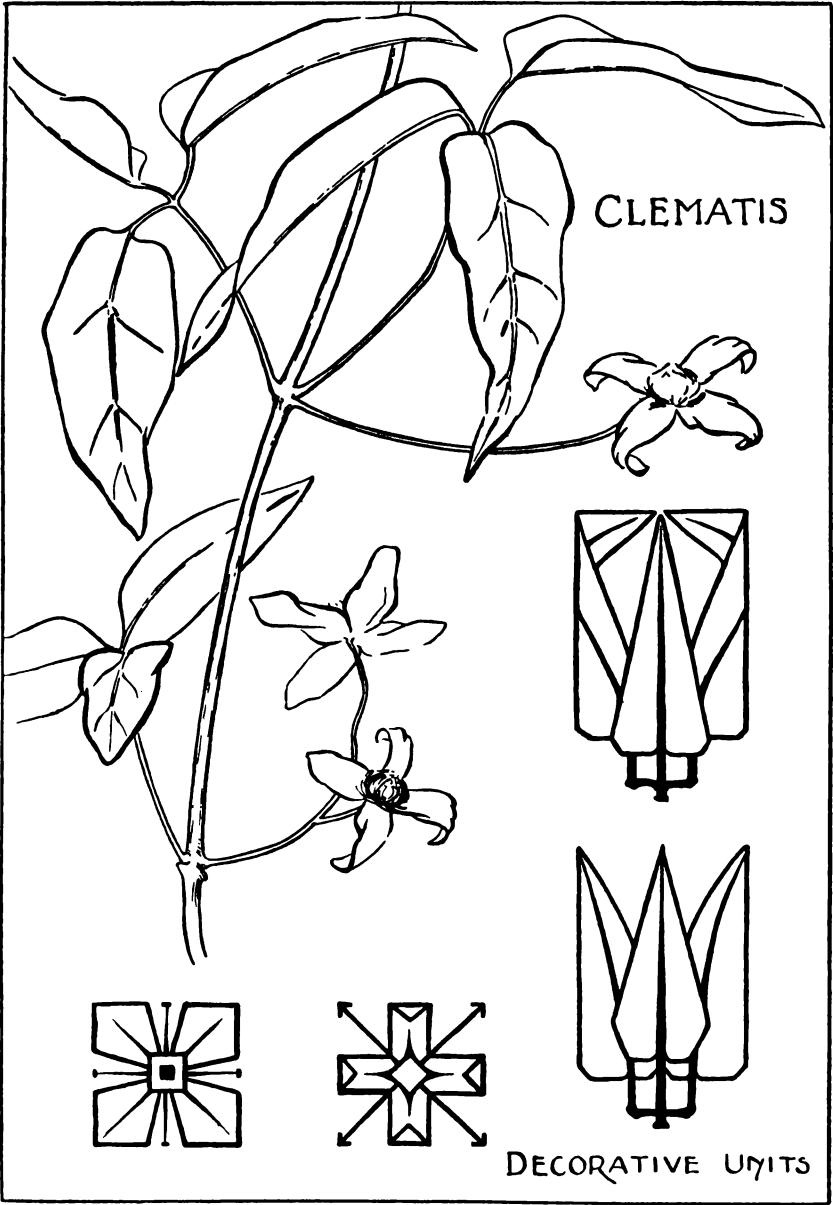
SINGLE LINE CAPITALS, LOWER-CASE LETTERS AND NUMERALS



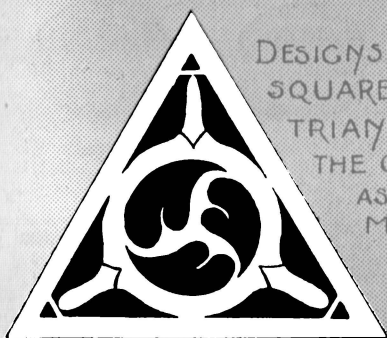
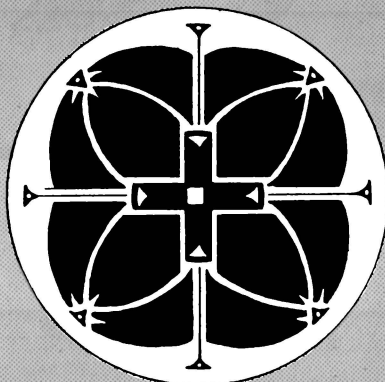
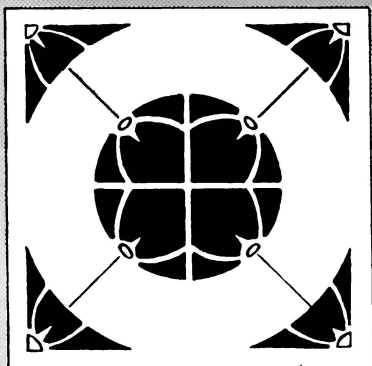
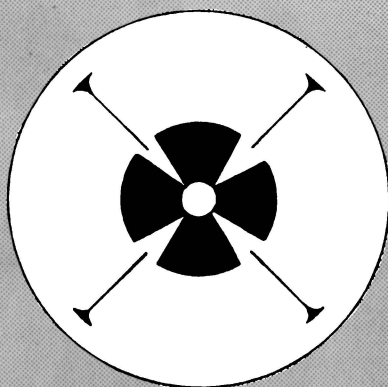
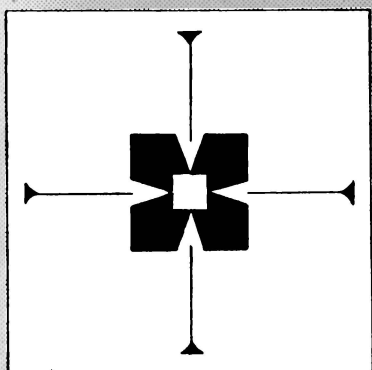
PLANT TREATMENTS



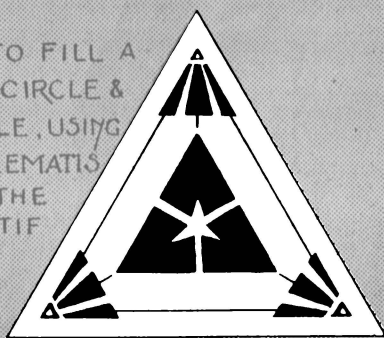
PLANT TREATMENTS

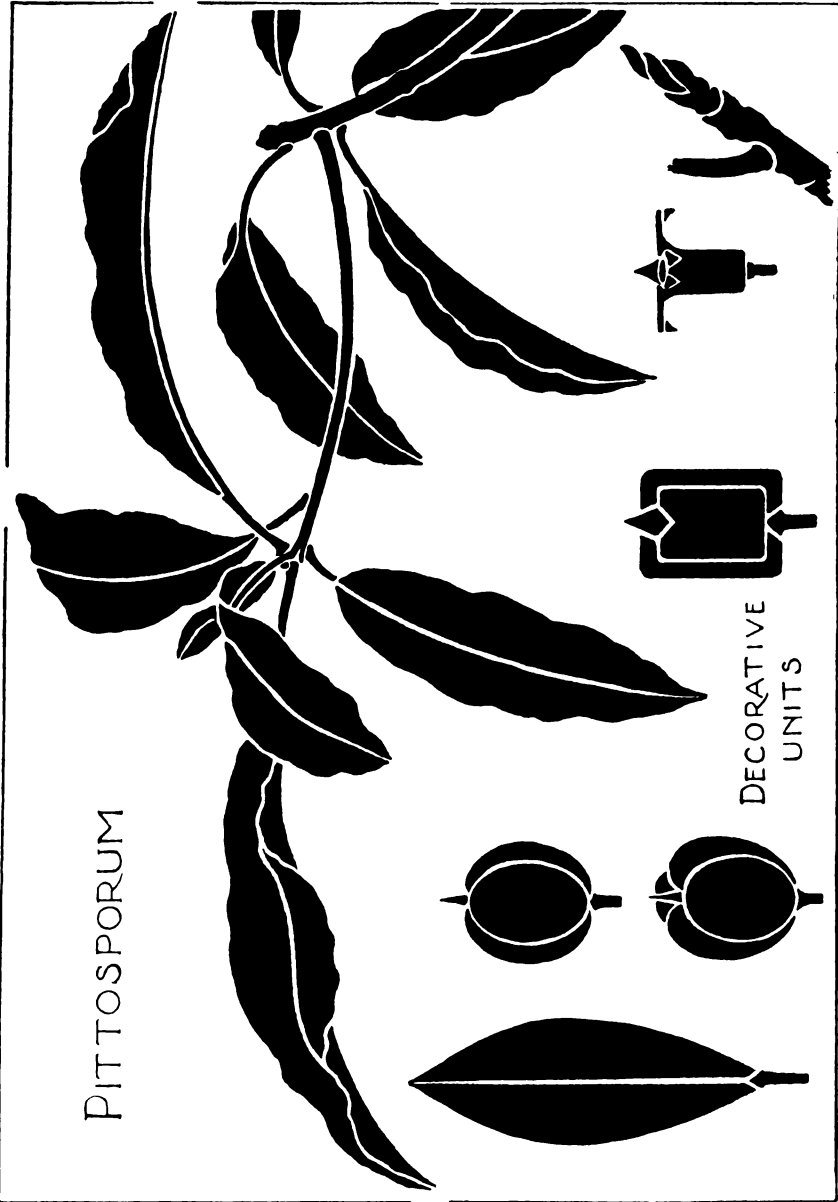


PLANT TREATMENTS



DESIGNS TO FILL A
SQUARE, CIRCLE &
TRIANGLE, USING
THE CLEMATIS
AS THE
MOTIF





BRUSH STUDY

PAPER AND CARDBOARD HANDWORK

To make Flour Paste—

- 1 cup of flour.
- $\frac{1}{4}$ teaspoon of powdered alum.
- 3 cups of cold water.
- 3 drops of oil of cloves.
- 6 drops of glycerine.

Place the cup of flour in a saucepan and add a small quantity of water. Mix together to form a creamy batter, then pour in 3 cups of water, and add the alum, stirring the mixture to a smooth batter. Place the saucepan over a slow fire, and allow the mixture to boil for a few minutes, stirring it constantly. Remove the saucepan from the fire and stir the mixture thoroughly. While it is hot, add the oil of cloves, which gives a pleasant odour, and add the glycerine, which causes the paste to flow smoothly over the paper. Keep the paste in a closed jar. Mix thoroughly before using, and if too thick, add hot water. The paste should be fairly thick when used for leatherwork, but for paper it should be about the constituency of thick cream.

How to Make Gum—

Gum for use in paper and cardboard building is made as follows:—

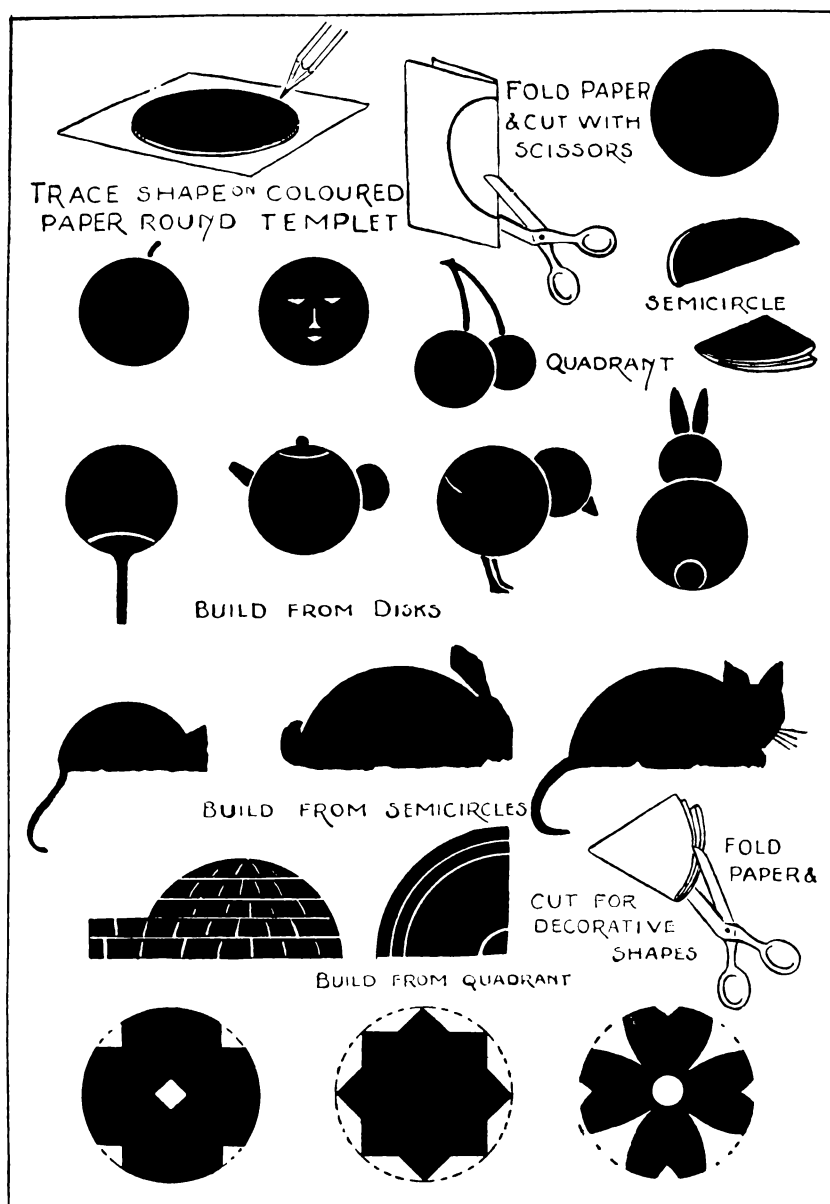
- 1 dessertspoon of gum arabic dissolved in water.
- 10 tablespoons of dextrin (British gum).

Pour the dextrin into a jar and mix into a thin batter, by stirring in 6 tablespoons of water, and adding the gum arabic. Place the jar and contents in a saucepan containing water and warm over a slow fire, but do not boil the mixture. Add 6 drops of glycerine, and put the gum in a closed jar or bottle.

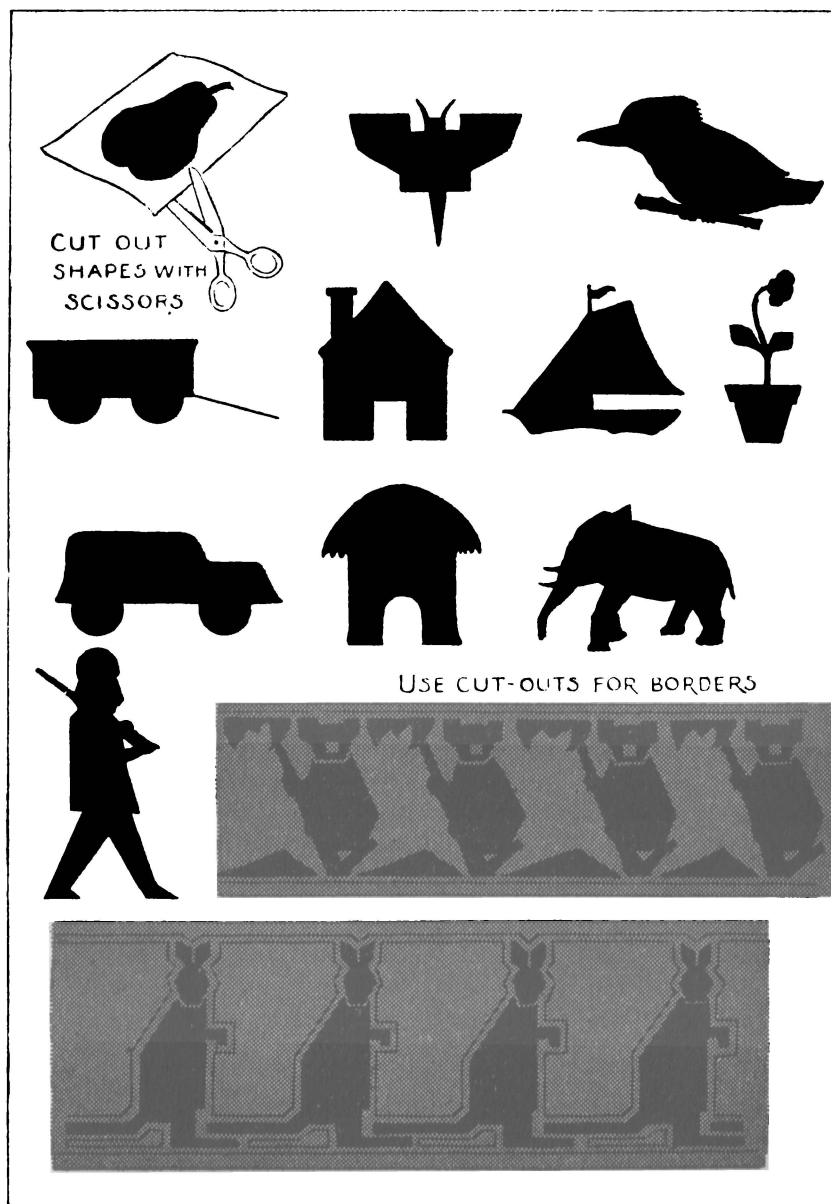
PAPER CUTTING, TEARING AND BUILDING

Paper work may be introduced by tracing simple shapes round a templet, and cutting them out with scissors, in order to build simple objects, birds, and animal forms. This work gives children facility in the use of scissors by cutting shapes from a drawn outline.

The templets are prepared and cut from strawboard, and finished with glasspaper to attain a smooth edge, so that the children can make accurate tracings from them. The use of coloured paper, to suit the colour of the object, bird, or animal, is recommended. The shapes are pasted on to a background, after



PAPER CUTTING, TEARING AND BUILDING



PAPER CUT-OUTS

which the details are added with small shaped cut-outs in coloured paper, or tinted with pastels or crayons. A paper with a matt finish is preferred to paper with a highly polished surface. For a semi-circular templet the disk is folded and cut along the diameter, then refolded and cut along the radius for a quadrant. The disk is folded into quadrants (see diagram), and the curved edges cut to make interesting decorative units. Further units can be obtained by cutting shapes from the radii and the curved edges. The templates can also be used for tracing forms, then adding the details for an outline or mass drawing on scrap paper, to make toys, friezes, etc.

Apple, sun, cherries, fan, teapot, chicken, and rabbit are built up from a disk templet; mouse, rabbit, cat, and igloo (snow house) from a semi-circle; and a fan from a quadrant.

Cut-outs, which are more difficult in outline, are illustrated on page 17. Fruit, flower, insect, bird, animal, and other forms are cut from coloured paper and mounted on a suitable coloured background.

The outlines of the forms are simple and direct, i.e., conventionalized, so that the tool (scissors) is more easily manipulated. If a number of similar shapes are required, this simplification will give a more uniform result, as illustrated on this page.

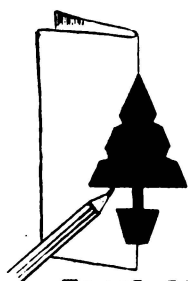
The native bear (koala) is selected as the *motif* for the border. He is shown sitting in a characteristic pose in the fork of a tree, with a supply of leaves above his head. The units are cut and pasted on a background to complete the border, which is suitable for the decoration in a nursery, or it may be applied as a coloured border on fabrics.

The kangaroo, which is used as the *motif* for this frieze, is poised in a sitting position. The outline is simple in form, and can be easily cut with scissors. A coloured line, following the form, is added to bind the units together. A band of coloured paper is added to the top and the base to complete the frieze.

DESIGNS FOR BOOK-COVERS

Simple methods of decorating book-covers are illustrated on page 19. A templet or pattern of a symmetrical unit is placed on a piece of thin ivory or strawboard; the paper is then folded and the unit cut to shape, which is then used in the form of a simple stencil plate.

The decoration on the first book-cover is in the form of a coloured border, applied through the plate, while the initials—E. J.—are cut-outs, and are pasted on the surface.

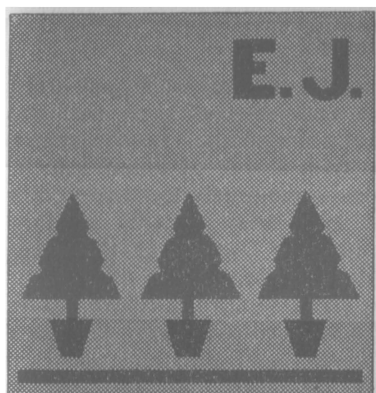


TRACE ROUND
TEMPLER ON
FOLDED PAPER

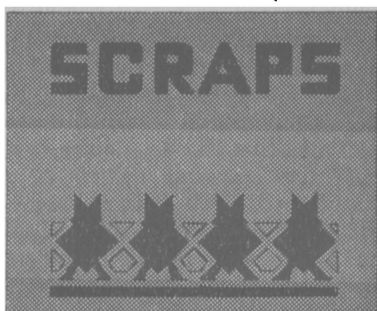
CUT OUT
SHAPE WITH
SCISSORS



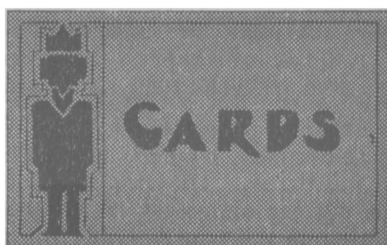
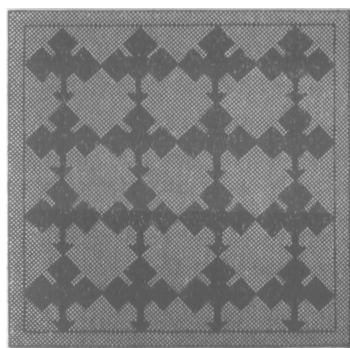
APPLY COLOUR
THROUGH STENCIL



PASTE ON LETTERS



COVER DESIGNS
FOR BOOKS



DESIGNS FOR BOOK-COVERS

For the diaper or all-over pattern, the construction lines are drawn lightly with a pencil to ensure an even spacing of units. The one unit plate is repeated at regular intervals to complete the decoration. The remaining covers are decorated through a plate, and the letters are pasted in position.

BUILDING WITH PAPER

A paper-chain is made from two strips of plain or coloured paper joined at the end with paste, and at right angles to each other (see diagram). Strip (a) is folded across strip (b), then (b) is folded across (a), and the process is continued until the full length of the strips is folded. A length of paper-chain is cut off and folded round into a rosette.

Bows and festoons are constructed from varying lengths of paper-chains.

A Paper Windmill

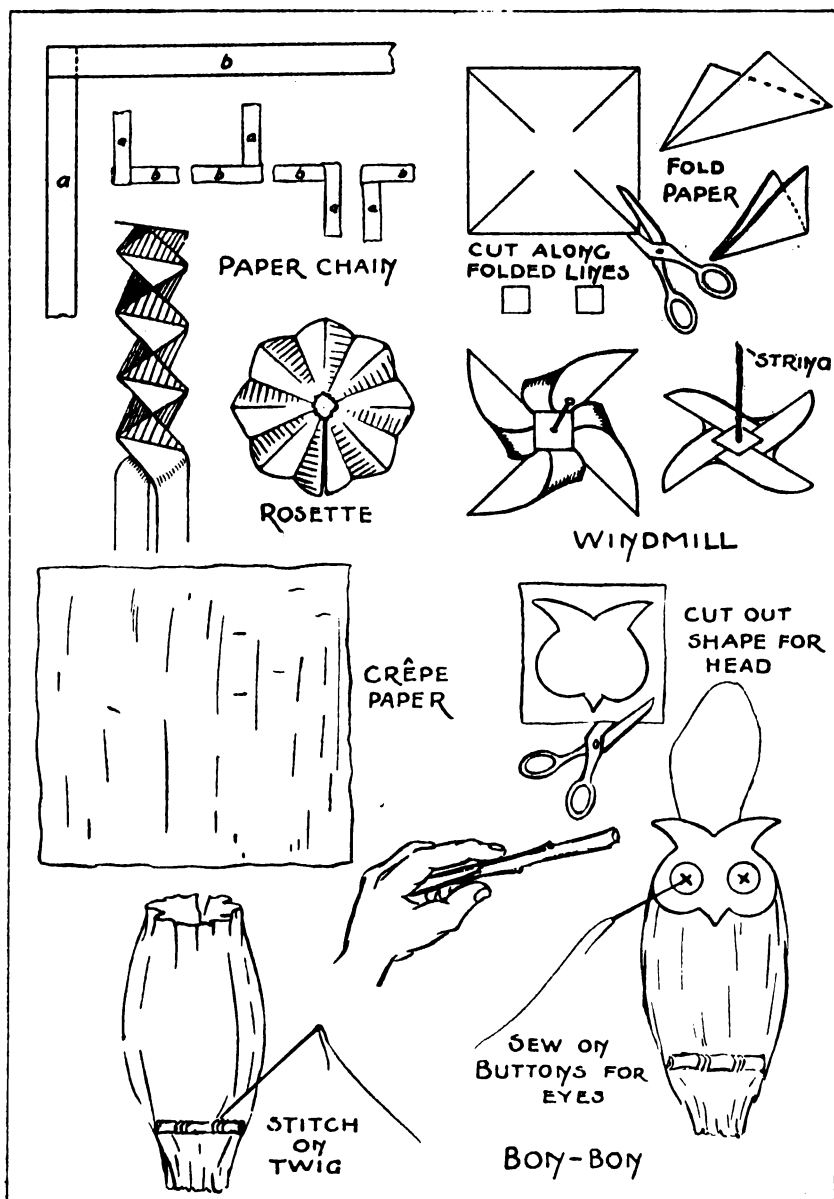
Select a piece of stiff paper—6 inches square, or larger—fold along the diagonal, then fold again (see diagram), so that the creases mark the position of the four diagonals. In the centre mark four points to form a square with a side of about 1 inch, and cut from the four corners along the diagonals to these points with the scissors. Then cut out two small squares of thin strawboard, each 1 inch side. Fold four corners of the large square into the centre, as shown in the diagram, place the two small squares in position, and push a pin through the centre. The model can be attached to the end of a stick with the pin, or a piece of string can replace the pin.

A Paper Bon-Bon (Owl)

Materials—

A piece of crêpe paper—9 inches by 6 inches, a small square of coloured ivory-board, a thin twig 2 inches long, two white buttons, and thread.

Fold the paper round in the form of a cylinder and gathered in at the base, which is held in position by stitching the twig on to the paper. The stitches represent the toes around the twig. Set out the outline of the head and cut to shape (see diagram). Gather in the paper at the top, taking care that the ends of the paper overlap at the back of the model, then place the head and buttons in position, and stitch on to the paper. The ends of the thread are tied into a loop at the back. Sweets may be placed in the bon-bon through the opening at the back.



PAPER CONSTRUCTION

Sweet Box

Stiff paper or thin ivory board is best suited for this model. The development is in one piece, which is set out as shown in the diagram. Each face in turn is folded over on the lines, and pressed down with the finger to ensure straight, sharp edges. The development is then folded together and the end flaps are held in position by pins or paper fasteners. The narrow band of paper is cut for the handle and inserted from the outside through two slits in the sides, to the inside, and fastened with pins or fasteners. A coloured border on the two sides, applied with a stick, cork, or potato stamp, will make the sweet box more attractive. This border should be applied before the development is folded.

If thin ivory-board is used, the base or folding edges must be 'scored,' i.e., the surface of the paper is cut with a knife, then folded along the 'scored' edges.

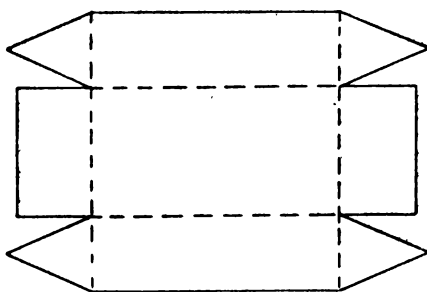
Kite

The frame is made from paling strips tied firmly in the centre, and bound together at right angles to each other with string, which is held in position by a nick at the end of each strip. The kite is then covered with strong brown paper (see diagram), and a tail is added.

A Doll's Cradle—(Page 25)

This model provides practice in joining and 'scoring' edges to build models from a development. The shape of the development is set out and provision made for joining-strips, i.e., narrow bands of material at the end of each face. Cut out the development and place it flat on a sheet of glass or tin. In order to fold the sides into position, the folding edges are 'scored' with a sharp knife, i.e., the material is cut just below the surface to allow for a sharp, straight edge. It will be noticed that the material is folded towards that side on which a crease is made, and not, as is usually done with scored edges, away from the cut side. The edges of joining strips are 'scored' and the cut surface is removed, so that a double thickness will not show at the joints. Fold the development with the joining strips inside. and glue or gum the model together. The hood and rockers are developed separately. The hood is held in position by a number of small scraps of paper, as shown in the diagram. The folding edges of the rockers are 'scored,' and bent into shape. Use gum or seccotine to fix the rockers in position.

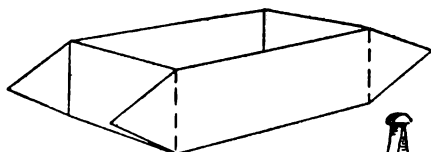
SWEET BOX



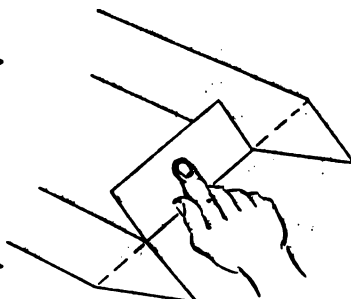
DEVELOPMENT



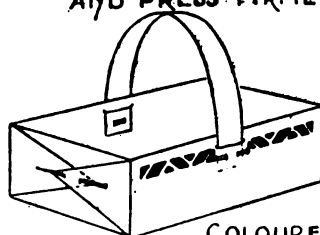
HANDLE



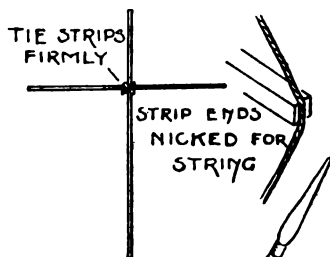
JOIN END FLAPS WITH A PIN
OR PAPER FASTENER



FOLD EACH FACE
AND PRESS FIRMLY

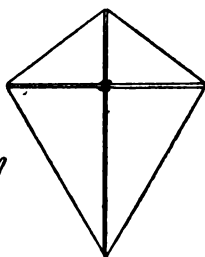


COLOURED
BORDER IS APPLIED WITH
A STICK OR CORK STAMP

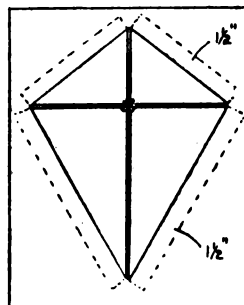


TIE STRIPS
FIRMLY

STRIP ENDS
NICKED FOR
STRING



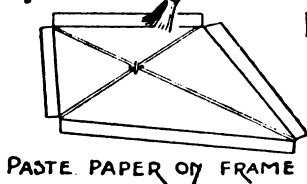
KITE



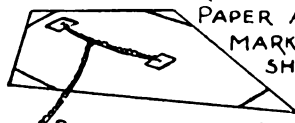
PLACE FRAME ON
PAPER AND
MARK OUT
SHAPE



CORNER
PIECES



PASTE PAPER ON FRAME



PASTE ON CORNER PIECES
AND ATTACH STRING

A Punt

Ivory-board or thin strawboard is used for this model. Draw out the development as shown in the diagram. It includes base, sides, end, joining strips, paddles, and three seats. The joining strips at the bow of the punt are nicked, so that they will follow the curve of the sides when pasted in the base of the punt. The surface of the joining strips is removed to half the thickness. The length of the strips for the bow is determined by taking short steps with the compass along the curved edge of the base. The same number of steps are set out along the straight strips. The seat-ends are folded down and glued in position.

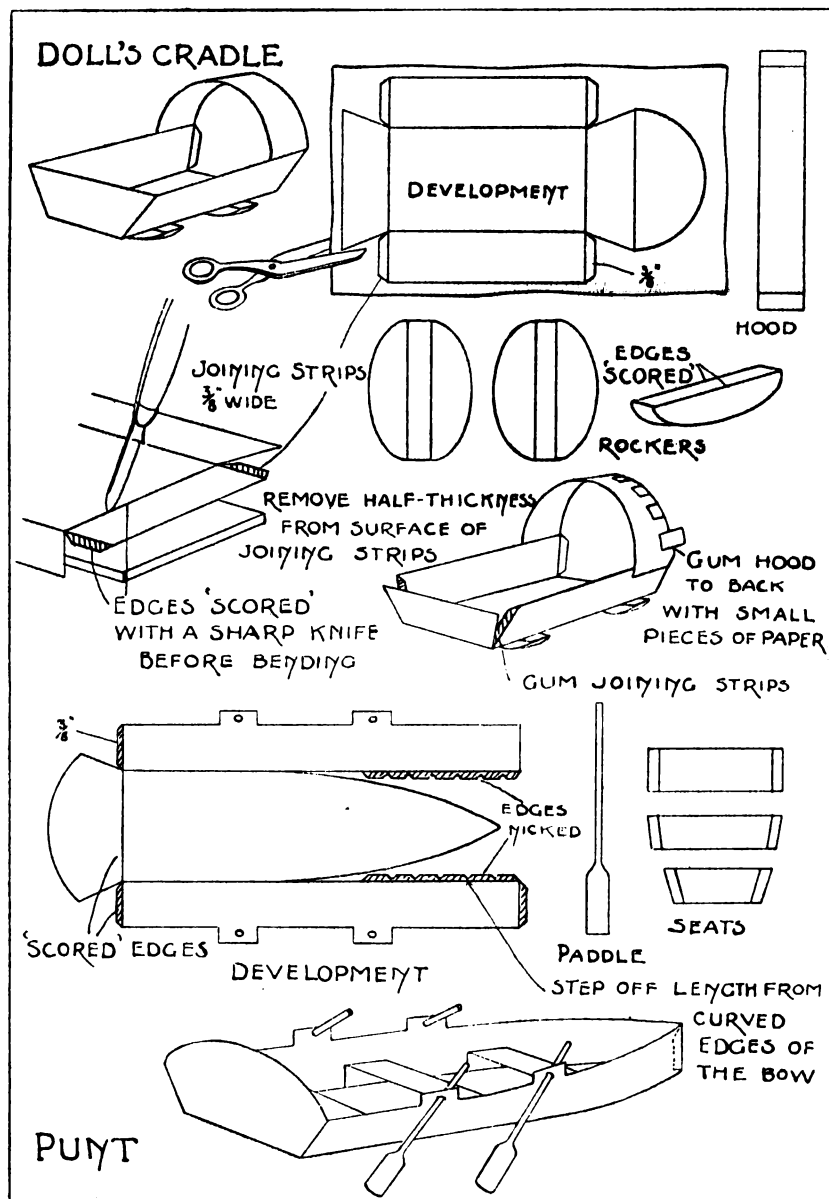
BUILDING WITH MATCH-BOXES AND MATCHES

Empty match-boxes provide inexpensive building material, while the rectangular shapes assist in the construction of simple common objects (see page 26).

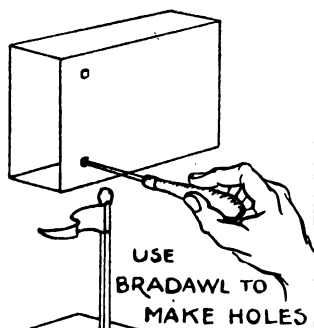
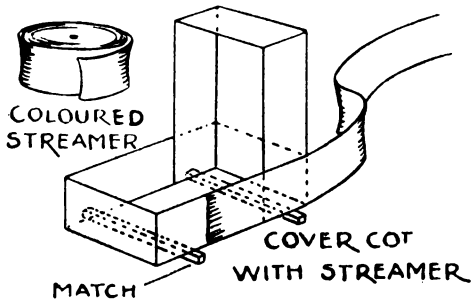
A doll's cot is made from two slides, one standing inside the other. Two used matches for the stand are attached to the base with gum or seccotine. The model is then covered with narrow paper streamers pasted on to the outer surface.

A model warship is built up from one slide, two covers, and a box containing a slide. Stand the box, containing the slide, in the centre of the slide, and at each end push on the two covers. A small bradawl is used to make the holes for the matches. A thread is tied around two matches at each end for the railing, a small paper pennant is attached to the flag pole, and matches for the guns are inserted at the sides.

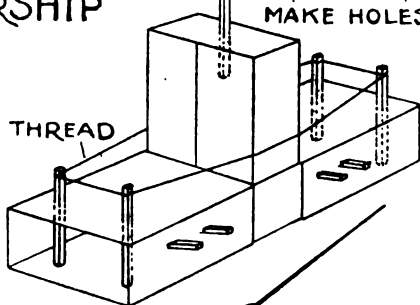
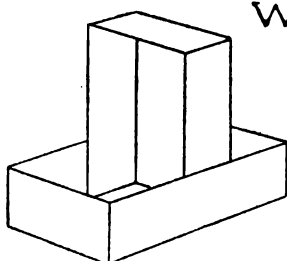
A small cabinet is also illustrated. Six boxes are pasted together and covered with coloured paper or wallpaper pasted on to the outer surfaces. Two matches are used for the base. The drawers are represented by the slide. Handles are made with needle and thread, or paper fasteners will be found suitable.



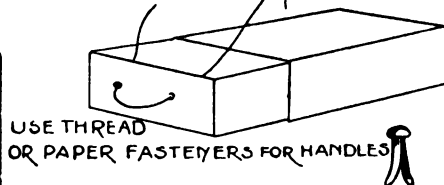
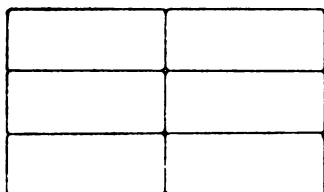
DOLL'S COT



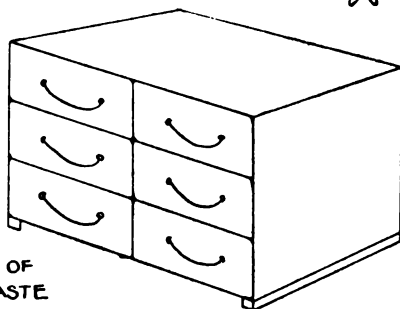
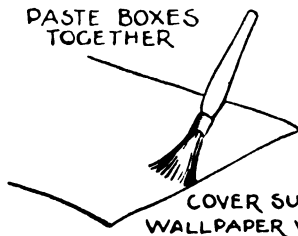
WARSHIP



CABINET



PASTE BOXES TOGETHER



BUILDING WITH MATCH-BOXES

LAMP SHADES—(Pages 28 and 29)**Materials—**

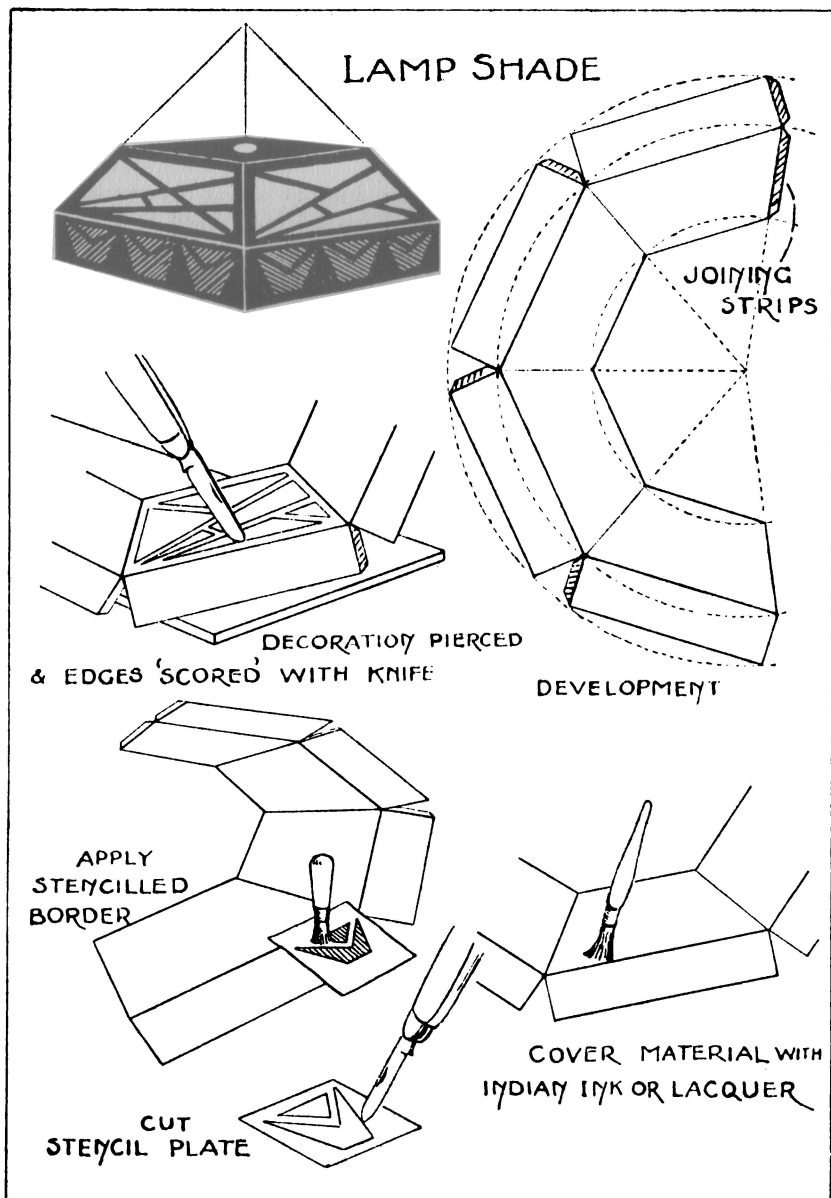
A large sheet of stout strawboard (cardboard) or ivory-board; Indian ink or flat black (a quick-drying spirit colour); a piece of coloured silk or strong coloured paper; glue, gum, or seccotine.

The development, which includes joining strips, is traced or drawn on to the strawboard. A sharp knife is used to cut out the outline. Then the division lines of the faces along the surface of the strawboard are cut (known as scored), so that the folds on the development will be straight and clean. After the edge of the joining strips (see diagram) has been scored, the surface is removed to the same depth of the cut. This makes the joining strips more pliable, provides an uneven surface for the glue, and obviates a double thickness of material at the joints. The pierced design on the sloping faces is traced or drawn on the material, and cut out with a sharp knife or pierced with a fretsaw. (For method of using a fretsaw, see page 85.) The decoration on the base of the other faces is applied by means of a stencil plate (see notes on stencilling) and oil colours. The surface and edges of the material, excepting the stencilled border, are coloured with a paint brush, by using Indian ink or the cheaper medium, flat black. Take care all the edges of the cut out patterns are covered.

The development is now ready to be folded into shape. Bend the faces slightly along the 'scored' edges until the outer edges meet. Then apply glue or seccotine to the joining strips, which are pressed firmly on the inside of the shade. A piece of string tied round the shade will keep it in position while the glue or seccotine sets.

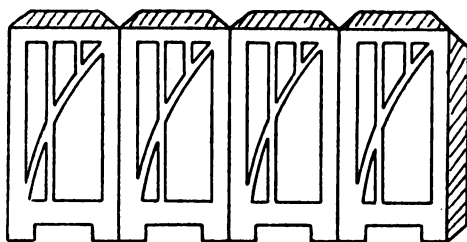
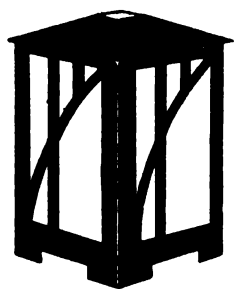
Another design for a lamp shade is shown on page 29. The lamp shade is developed in two parts—a rectangular shape for the four vertical faces and a special construction for the pyramidal top. The method of decorating (excepting the stencil border) and of building up the shade is similar to that used for the previous model. Before the sides are joined together, four rectangular pieces of coloured silk are gummed on the back of each face, and the shade is finished as shown in the illustrations.

Another method of building up a lamp shade is to cut out each section separately, and join them together with narrow strips of thin strawboard folded over the joints and attached by paper fasteners from the outside. The flat black colour will cover the domed tops of the fasteners.



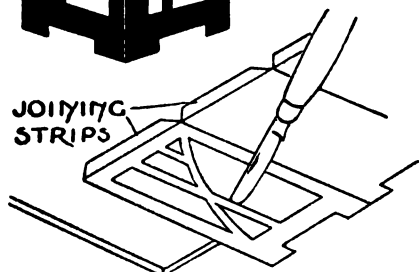
CARDBOARD CONSTRUCTION

LANTERN

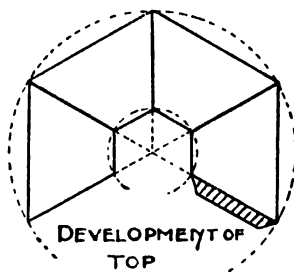
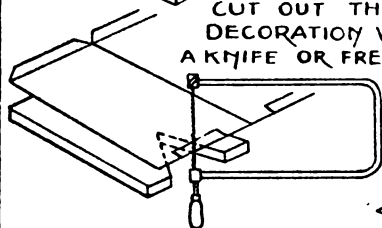


DEVELOPMENT OF SIDES

JOINING STRIPS

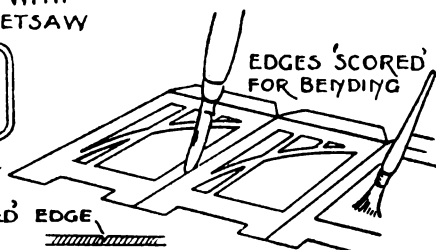


CUT OUT THE DECORATION WITH A KNIFE OR FRETSAW



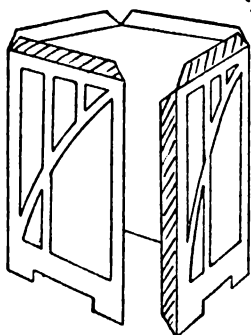
DEVELOPMENT OF TOP

EDGES 'SCORED' FOR BENDING

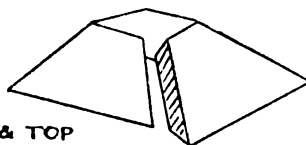


'SCORED' EDGE

FACES BENT



COVER SURFACE & EDGES WITH A COAT OF INDIAN INK OR LACQUER



SIDES & TOP READY FOR GUM

PAPER MOSAICS

Paper mosaics, or crazy-work, is decorating the surface of a tin, bottle, or jar with pieces of coloured paper to form interesting patterns. The material is inexpensive, and suitable objects are easily obtained.

Materials—

Tins, bottles, and other articles to provide suitable shapes. Coloured advertisements from papers and magazines (papers with a matt surface are more suitable than those with a highly glazed surface). Indian ink (black), lacquer, and flour paste (directions for making flour paste appear on page 15).

String Container

On page 31 a syrup tin or treacle tin, with a lid, is decorated with paper mosaics, and made into a string container by placing a hole in the centre of the top to allow the end of the string to be pulled out from the container.

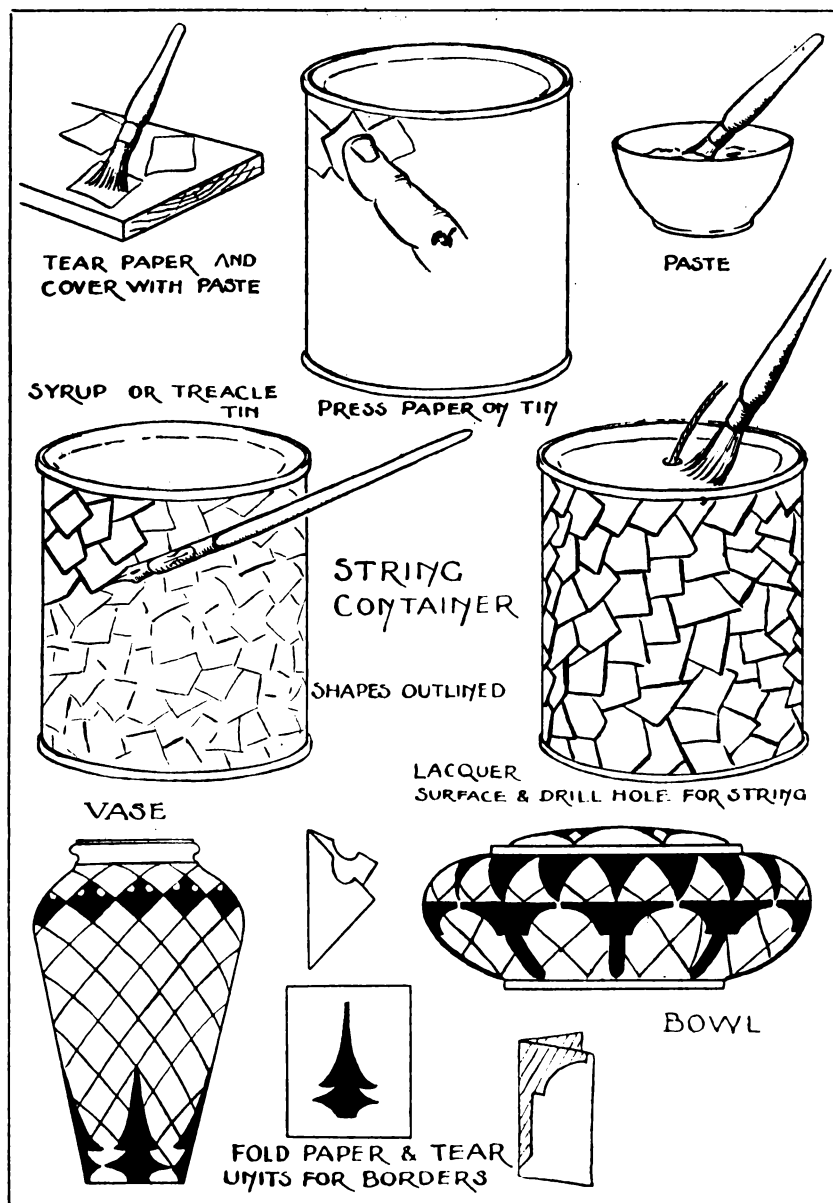
Tear the paper into small regular scraps, and put a coat of paste on the back of each one, then press them firmly on the surface of the syrup tin, leaving a narrow margin at the top and bottom. Do not cut the scraps or paper with the scissors, or the edges will be too hard, and will show as definite ridges on the surface. Wipe off any surplus paste with a clean cloth. Each piece of paper should slightly overlap when the work is dry. Outline each piece of paper with a firm, broad line of Indian ink. The outline can be put on with a broad-nibbed pen or a water-colour brush. Apply a coat of lacquer to the upper and lower bands to cover the tin and the top. The colour of the lacquer should be considered in relation to the colour of the paper used for the decoration. Allow the work to dry, then finish with a coat of clear lacquer, which will give a glazed pottery appearance.

Mosaic Vase or Bowl

On the same page, a glass jar is covered with paper mosaics, and a decorative coloured border is arranged at the top and base of the jar.

In this exercise the scraps are made as regular as possible in the form of a diaper or all-over pattern. The units for the borders are folded over and torn as shown in the illustration. Apply paste to the back of the units, and press firmly over the first layer of paper. Outline with Indian ink, and colour the top, portion of the inside, and base of the bottle with lacquer, finally finishing the vase with a coat of clear lacquer.

A small bowl is also illustrated, and the method of decorating with paper mosaics is the same as for the string container and the vase.



PAPIER MÂCHÉ

Materials—

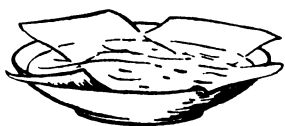
Old newspapers, or tissue paper; flour paste; a mould, i.e., a plain basin, glass bowl, or a mould made from plaster of paris.

Select a small bowl for a mould. Soak the newspaper in a dish of water, then tear the paper into pieces about one inch square, leaving thin jagged edges. If the paper is cut with scissors, the edges of the paper will show as definite ridges on the model. First soap the mould well to prevent the paper from sticking when dry. Arrange the pieces of paper in a layer upon the exterior of the mould, commencing at the centre of the base. Cover this layer with a thin coat of paste, and add another layer of paper. Continue this process for 10 or 20 layers until the desired thickness is obtained. A small disk of cardboard can be pasted on the base to make the model stand firm. Finish the model with a coat of paste, and put aside to dry. The model will set hard and firm. A smooth finish can be obtained by rubbing down the surface with glasspaper, and applying a coat of size (a glue preparation), which can be bought in small packets. The size makes the surface non-absorbent, and colour can be applied without soaking into the model.

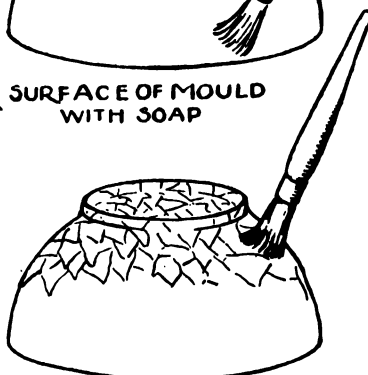
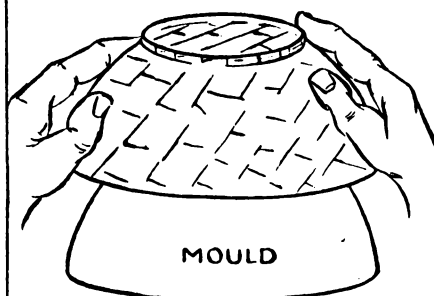
To make the model attractive, a geometric pattern is applied, suitably coloured and finished with a coat of varnish or lacquer.

Paper masks are built up in the same way. A plaster mould of a face is required (see notes on pressed cement). A thin coat of knotting or size is put on the inside surface of the mould to prevent the model from sticking to it. The work is done from the inside of the mould. A doll's head can be made in two sections—one mould for the face, and the other for the back of the head. The two sections are then joined together with paper and paste, and coloured.

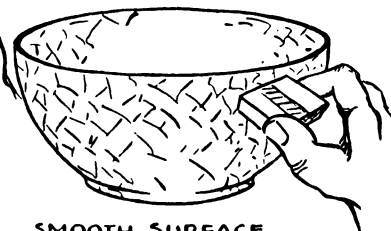
SOAK PAPER IN WATER



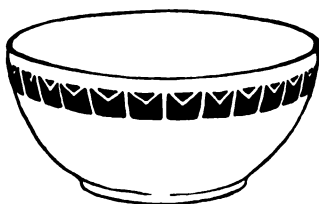
COVER SURFACE OF MOULD WITH SOAP

TEAR PAPER
IN SMALL PIECESPRESS PAPER SCRAPS
ON MOULD AND COVER
SURFACE WITH PASTE

MOULD

REMOVE PAPER MODEL
FROM MOULDSMOOTH SURFACE
WITH GLASSPAPER

APPLY COAT OF SIZE

ADD BORDER AND FINISH
WITH LACQUER

PAPIER MÂCHE

BOOKMAKING**School-paper Cover****Materials—**

Two pieces of strawboard (commonly called cardboard) 11 inches by 7 inches; cover paper (coloured) or cloth cover; small piece of linen 13½ inches by 1¼ inches for the hinge cloth; paste; fine cord or strong white thread.

A sheet of newspaper spread over the desk will keep it clean.

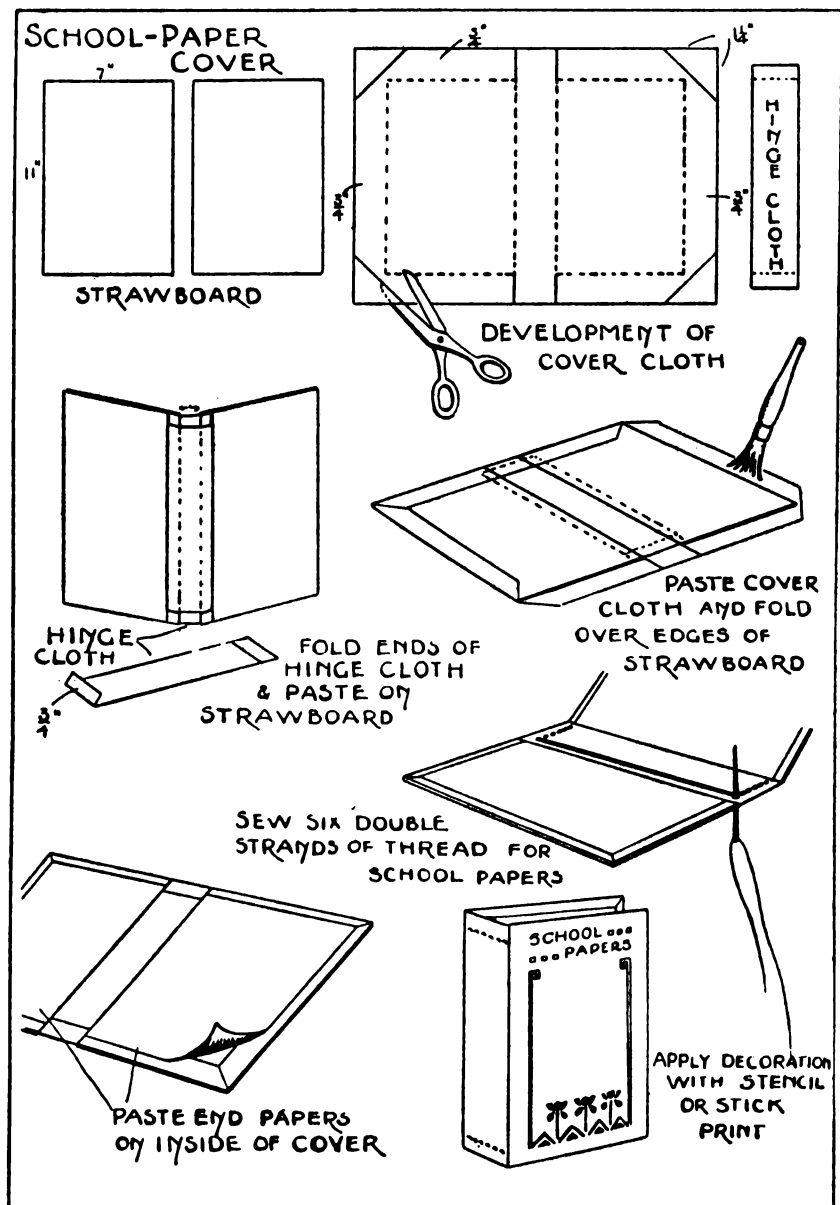
Place the strawboards flat on the desk, with the long edges parallel to each other, and ⅜-inch space between them to allow for the thickness of the cover. Turn over a ¼-inch lap to the outside at each end of the hinge cloth, which provides another thickness for the string to hold the School Papers, and paste it carefully on to the strawboards. The laps face outwards (see diagram). Another method is to make the hinge cloth 1 inch longer than the strawboards, to allow for a ½-inch fold around the ends of them.

A recipe for making paste is given on page 15. While the paste is drying, draw and cut out the size and shape of the paper cover or cloth cover. The outside measurements are 16½ inches by 12½ inches. Mark points 1¼ inches from the corners along each edge, and cut them off at these points at an angle of 45° (see diagram). Four ¼-inch cuts are made on the portions of the cover paper, which are to fold over the hinge cloth. Lay the strawboards on the cover, with the hinge cloth underneath, after giving the inner surface of the cover a thin coat of paste. Make certain no small lumps of paste remain. Turn over the long ¼-inch laps of the cover, then the end laps, and press firmly, working out any air bubbles that may appear. Two end-papers 6½ inches by 10½ inches, which may have been previously decorated as an exercise, in stick, cork, or lino printing, are pasted over the inside of the strawboard, and over the edges of the laps which have been folded over the edge of the strawboard.

With a double strand of fine cord or strong thread, sew six rows of double thread to provide for 12 School Papers. Do not knot the thread at the first stitch, as this is liable to pull through the cloth. Leave a short end of thread, and when the six double rows are completed, stitch the thread back to the first stitch and tie both ends securely together.

Note.—The stitches should not pull through the cover, as it has three layers, the hinge cloth, the lap of the hinge cloth, and the cover. A thin strip of linen pasted on the inside of the School Paper will prevent the thread from cutting the paper.

A simple stencilled or printed decoration is added to complete the cover.



SCHOOL-PAPER COVER

Materials—**A Book (One Section)**

Sheets of paper to be folded into leaves; cord or thread; strip of linen, cloth or a stiff paper cover; paste and glue.

The method of folding a sheet of paper for the leaves of a one-section book is shown on page 37. Keep the long way of the paper parallel to the body, turn the right-hand edge of the sheet on to the left-hand side, then press down and crease at the fold with the thumb nail. The two leaves form a folio, a second fold gives a quarto, and the third fold gives an octavo.

A section of a book consists of a folio of pages. The number of pages in any one section may be 8, 16, or 32, or even 64, but this number is unusual. The leaves of the section are tapped down evenly, and a strip of linen cloth is pasted on the back to prevent the stitches from tearing through the pages, and provides a strong joint between the section and cover. The leaves are sewn together with cord or strong thread, through three holes punched along the line of the folds. The thread is taken from the inside through the centre hole to the back—up the end hole on the inside—along the inside to the hole at the other end—through to the back and up to the centre hole to the inside. The long stitch on the inside is tied between the two ends of the thread (see diagram).

The cover is prepared to size, two pages for the front, and two for the back. Put a coating of glue on the inside of the hinge section of the cover, and on the back of the section. Press the section into position. Paste a $\frac{1}{4}$ -inch strip along the bottom edge of the end page, nearest the section, and press on to the first page to cover the strip of linen cloth, and also to assist in holding the section in position. (This is known as tipping). Then apply a coating of paste all over the inside of the cover, and stick the first end page on to it. Place two end pages at the back, and repeat the process.

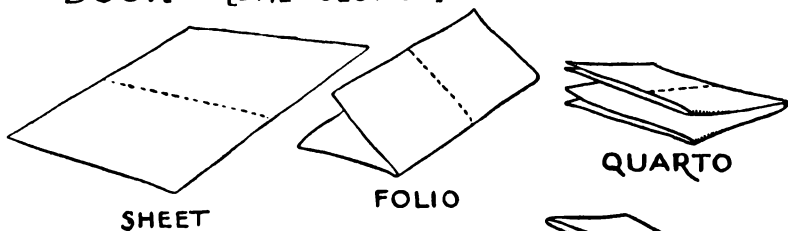
Many books have the cover sewn on to the pages at the hinge. The stitches are taken through the pages and cover with three stitches in one operation.

Materials—**A Book (Six Sections)**

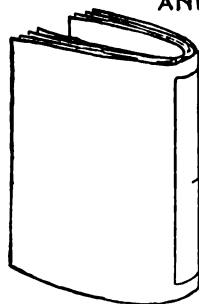
Sheets of paper for pages, 2 pieces of strawboard, cover paper (coloured) or cloth cover, a length of $\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch tape, cord or strong thread, paste, glue, and a sewing frame for tape (see diagram, page 39).

Arrange the folios into sections, space out the tapes and secure them with small tacks to the sewing frame. Four tapes will be found convenient for an ordinary book—the number will vary according to the size of the book. Place one section in position

BOOK [ONE SECTION]

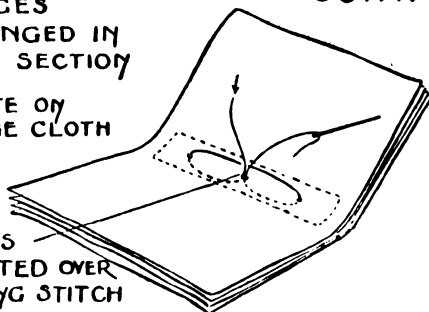


SHEETS FOLDED
AND PAGES
ARRANGED IN
ONE SECTION



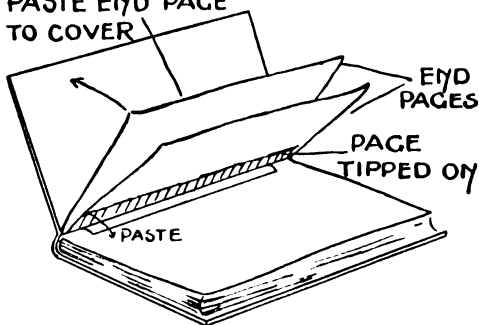
PASTE ON
HINGE CLOTH

ENDS
KNOTTED OVER
LONG STITCH



SEW PAGES WITH THREAD

PASTE END PAGE
TO COVER



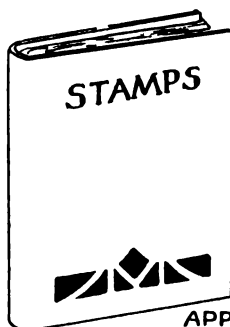
END
PAGES

PAGE
TIPPED ON

PASTE

SECTION PLACED IN
COVER AND GLUED

BACK
VIEW

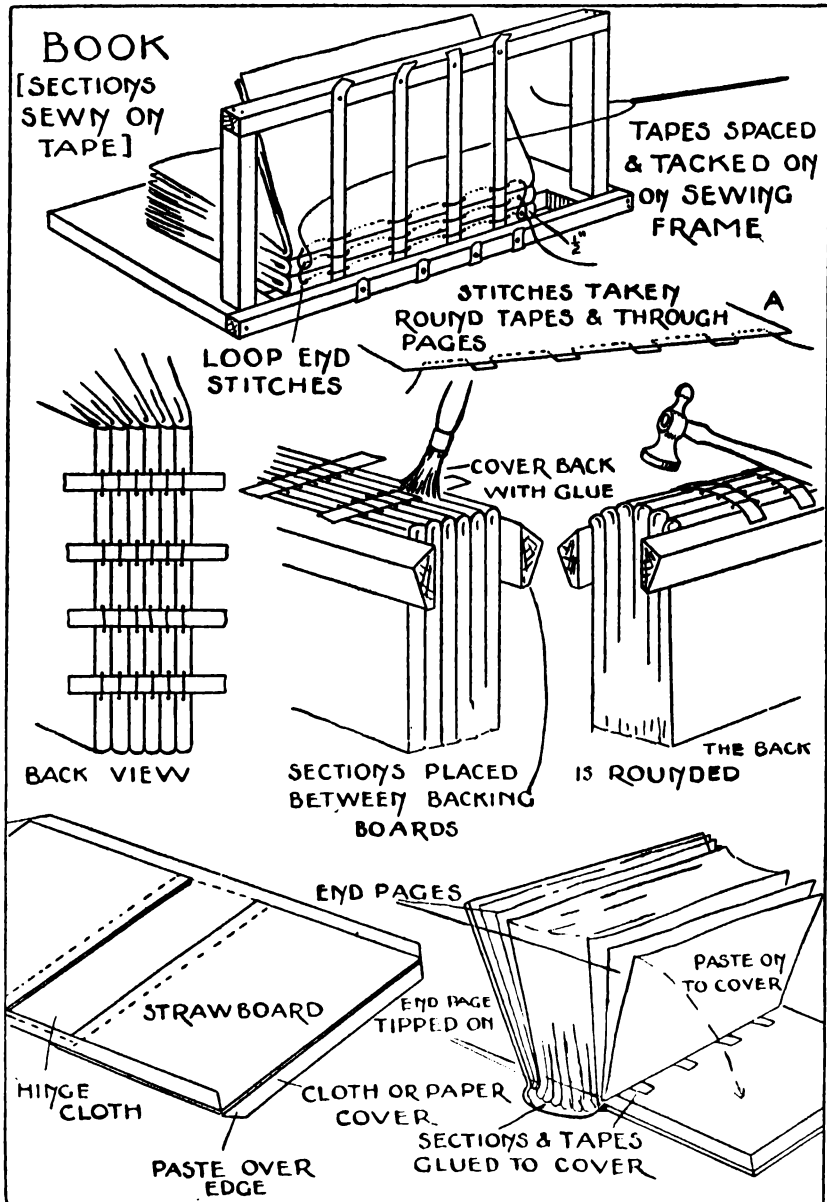


APPLY
DECORATION WITH A
STENCIL

on the block at the base of the frame, with the fold of the section touching the tapes. Open the section in the centre, place the left hand inside, and hold the needle and thread in the right hand. The first stitch is made about $\frac{1}{2}$ -inch from the end, where the needle is pushed through the section into the inside. The needle is then taken in the left hand, pushed through to the outside at the edge of the tape, and taken across the tape on the outside, then into the section again. Continue these stitches in the same way across the section to the other end (see diagram A). Do not stitch through the tapes, but around them. The second section is placed in position, and the needle is inserted into the upper section directly above where the needle came out of the first section. Sew the second section in the same manner. At the end of the second section, the thread is looped on to the end of the lower thread and tied in a knot. The thread is looped and tied to the lower section at each end.

When all sections are stitched, remove the tacks and centre the tapes across the back of the sections. At this stage, two waste end-papers are placed on each side of the pages to protect them from glue or paste. The sections are placed between two backing boards, which are hardwood boards shaped (see diagram), and are longer than the sections. Place the sections and backing boards in this position in a vice or press, and cover the back with a liberal coating of hot glue. Allow the glue to dry thoroughly, then, with glancing blows of a hammer, round off the back. Remove the backing boards and the waste end papers, and cut off the tapes to within one inch of the pages.

The sections are now ready for the cover, which is built up in the same way as the School-Paper cover, except that the two end papers are not pasted on the inside of the strawboard. Measure carefully the width required for the hinge and the hinge cloth, which will vary according to the thickness of the book and the width of the cover. Make the hinge cloth 1 inch longer than the length of the strawboards to allow for folding around the ends. The strawboards are cut to allow a $\frac{1}{4}$ -inch projection (squares) at top, tail, and front of the book. Open out the cover and lay it flat on top of the desk, cover the back of the sections and the inside of the hinge cloth with glue and press together, allowing the tapes to project on each side. The tapes are then glued to the strawboards (see diagram), and the end pages inserted at the front and back. One is tipped on (i.e., a $\frac{1}{4}$ -inch strip along the bottom edge is pasted on to the first page), and the other one is pasted on to the strawboard to cover the junction of the tapes and the inside of the strawboard. The end pages at the back are pasted on in the same manner.



BOOKMAKING

PRINTED DECORATIONS

STICK PRINTING

General Directions—

Sticks about 2 inches or 3 inches long, and of various cross sections, are used. The pattern on the end of the stick is obtained by filing with flat, triangular, or round files. A hard, close-grained wood gives best results, as softwoods wear quickly. Sticks can be circular in section (dowels, pegs, cotton reels, or pencil ends), square, semi-circular, or triangular.

To make a Colour Pad.—Obtain a small circular tin, about 1 inch high; a length of flannel 2 inches wide; double it over, making a width of 1 inch, and roll into a cylinder, which is pressed firmly into the tin. To decorate articles that do not require washing, saturate the pad with thick water-colour, which can be bought in 3d. or 6d. tubes; but, if the article is to be washed, then oil colours, which are bought in small tubes, must be put on the colour pad. After use, the pad can be taken out and washed in cold water to remove water colour, and in hot water to remove oil colour.

For stick printing, paper with a matt finish gives better results than paper with a highly polished surface.

Suggested Articles

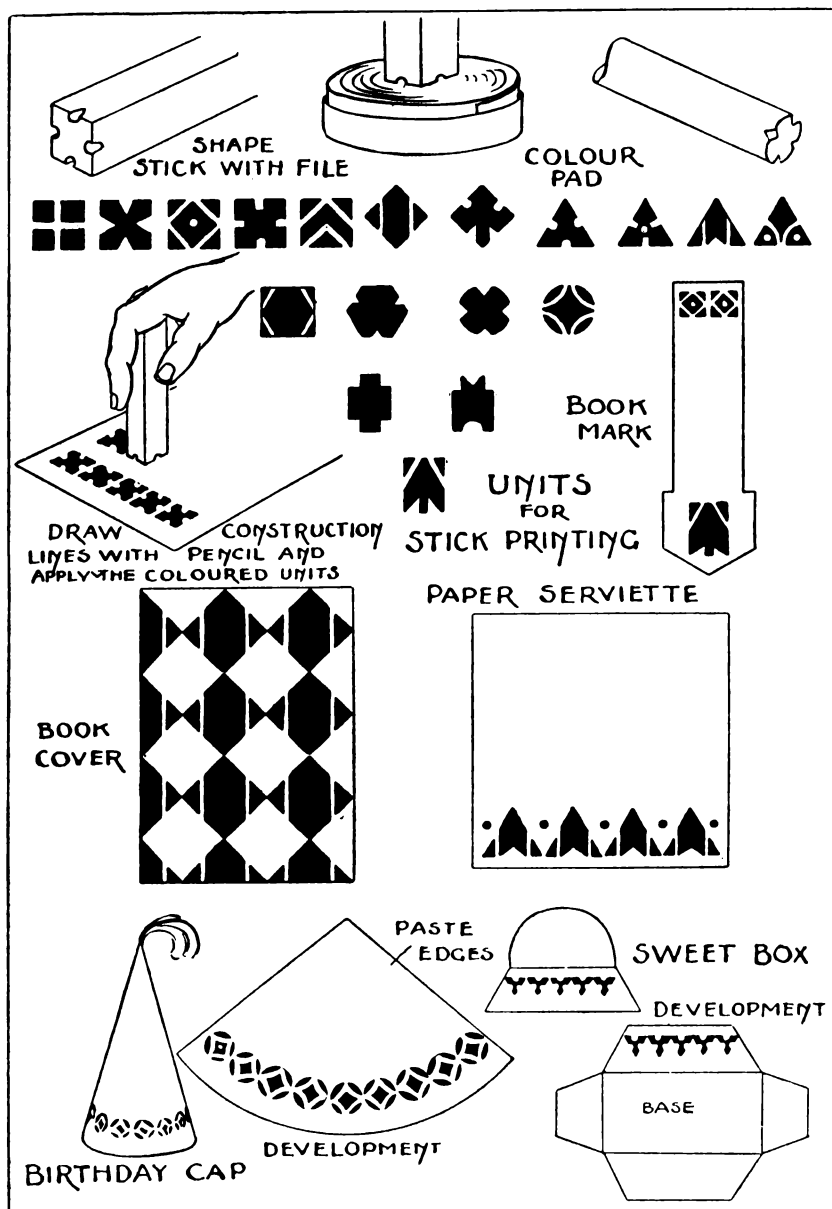
On page 41 a book-mark, which is cut from cardboard, is decorated with units applied with a stick.

A cover for a book is also shown. The construction lines of the pattern, which is in the form of a diaper or all-over pattern, are drawn lightly with a pencil; the stick is then filed to shape and the colour applied to the paper. When the colour is dry, the pencil lines should be cleaned off.

The paper serviette is decorated with a stick pattern in colour. The dots are printed with a pencil end. When printing on a thin material, always place several layers of newspaper or blotting paper underneath.

The development of the paper birthday cap is shown. It is set out with a ruler and compass. Draw two arcs parallel to the base for the position of the coloured border. File the end of a clothes peg to the shape of the unit, and apply the colour for the design from the pad. Attention should be given to the working out of interesting colour schemes.

Develop the sweet box as shown in the diagram. It can be made from stiff paper or thin cardboard. The end of a triangular stick is filed to shape, and the border set out on each face with the pencil. The units are then applied with colour from the prepared colour pads.



POTATO AND CORK PRINTING

General Directions—

Potato Printing

A great variety of designs for printing can be cut from raw potatoes. As the printing surface is fairly soft, it holds the colour, and when applied to materials the colour spreads evenly over the printed design. Blocks are cut from raw potatoes with a knife, and can be easily changed into other shapes. Potato blocks tend to perish and shrink if kept for longer than a day.

Cork Printing

Cork is an excellent medium for printing. Select a cork that has not been damaged by a corkscrew or pitted on the printing surface. With a sharp knife, carefully cut the cork to the required shape. Thick water colour, or oil colour (for printing on washable fabrics) should be brushed on the printing surface, or the print will not be sharp and clear. Press the cork on the material with a slight rocking motion. Cork may be purchased in any size and thickness.

Suggested Articles

On page 43 some decorative units suitable for borders and diapers (all-over patterns) are shown. The method of printing on fabrics in colour is illustrated. Newspaper or blotting paper is placed under the material in order to assist the block to sink into the material, and so give a good print.

A design is shown for a child's pianofore, decorated with a coloured border in oil colours, and printed with cork cut to shape.

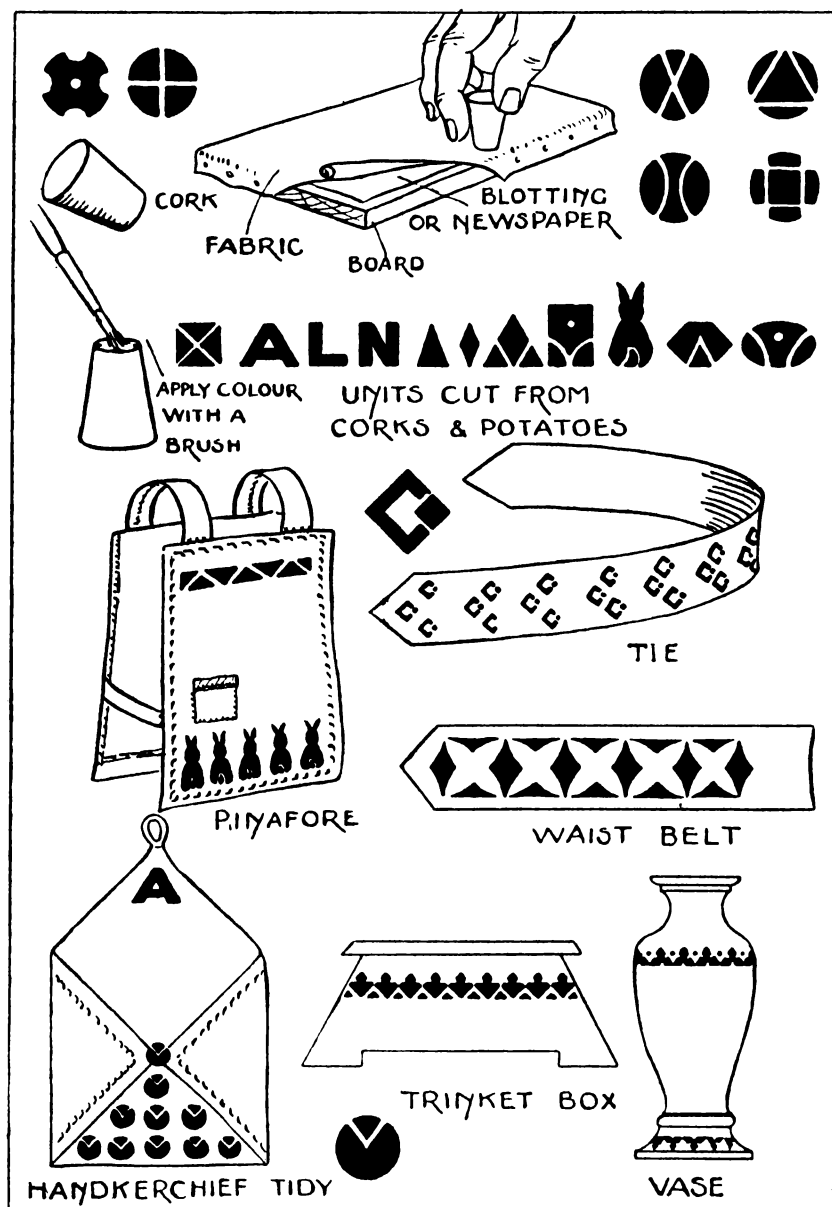
The tie is decorated with an all-over pattern, which consists of small diamond shapes, spaced at regular intervals over the surface. The design is printed with cork and oil colours.

The belt is decorated in the same way. All foundation lines are set out lightly, so that the design will be neat and regular.

A simple handkerchief tidy is illustrated. An initial letter and a small diaper pattern is added to complete the design.

A cork print is used to apply a decorative border to the wooden trinket box.

The borders on the vase are printed with potato stamps. As the surface to be decorated is curved, the potato will be more effective than sticks or cork.



LINOLEUM BLOCK PRINTING

Sticks, corks, and potatoes are suitable for printing of small units to form patterns, but linoleum can be used in larger sizes. Monograms, scenes, pictures, and larger units can be used and printed. Linoleum can be cut with greater freedom and with more variety than either wood or cork.

Materials and Tools—

Linoleum, white paint, penknife, gouges, ink, paper.

Brown linoleum without a pattern on it is best suited for block-making, and the thicker the quality the better. 'Battleship' linoleum is the best kind. Chinese white paint can be bought in small tubes at 3d. or 6d. each, or poster water-colour paint in bottles. Gouges are used for removing the unwanted parts of the linoleum block. Woodcarving gouges, sections of which are shown on page 45, may be used, or a satisfactory home-made gouge can be made from an old umbrella rib. A short piece of rib about 3 inches long is cut off, and one end is inserted in a wooden handle (see diagram). The other end is sharpened to a cutting edge with a fine file, and smoothed off lightly on an oilstone.

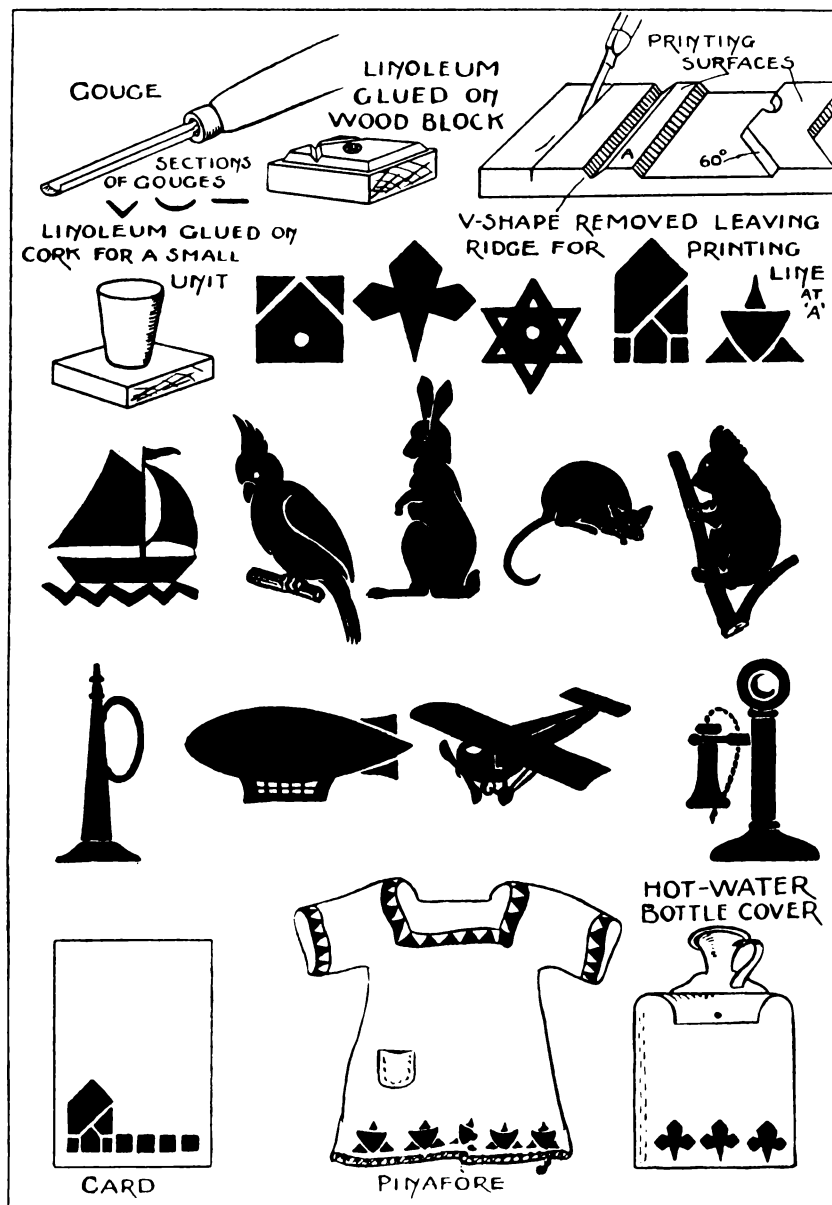
Suitable inks are:—Indian ink, typewriter, rubber-stamp, and printers' inks.

Papers that are absorbent and readily take ink are: cyclostyle, rice, printing, and blotting paper.

When small units are being printed the linoleum is mounted on cork with seccotine, or on a small wood block with glue (see diagram).

General Directions

Make a drawing of the units or design to be printed, and treat it in silhouette, that is, the design shows black against the white background. Take a pencil tracing of this drawing on tracing paper. Thinly coat the surface of the linoleum with white paint and allow it to dry. Reverse the tracing, and pin it on to the linoleum with drawing pins. If the design were to read the correct way of the block, then the print would read the reverse way; therefore the design on the block must be reversed. Stick the pins into the parts of the linoleum that have later to be cut away. Trace off the design with a pencil. Remove the tracing, and with a pencil line in the drawing. Paint in the picture with a brush and Indian ink. It is now ready for cutting; the black parts must remain, the white parts must be cut away with a knife, or scooped out with a gouge. The edges of the printing surface must never be vertical, as a vertical edge will always leave weak edges;



LINOLEUM BLOCK PRINTING

it should slant away from the surface at an angle of about 60° (see diagram). Remove the white painted parts with a gouge, and the block is ready for printing. Thinly paint on the ink with a brush and place the printing paper on a level surface—the floor is an excellent place. Put the block on the printing paper and stand on it for a few moments, pressing with the whole weight of the body. Remove the block from the paper very carefully. If a press is available for printing, even better results can be obtained.

Suggested Articles

Many units are shown on page 45 that are suitable for linoleum block prints. A small card is decorated with linoleum block prints, which are cut out and the designs applied with water colours.

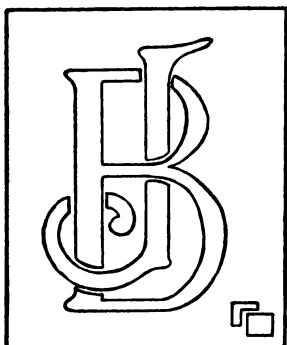
A simple border design on the bottom of a pinafore adds additional decoration to it. The border is applied with a linoleum block and oil colours.

Always place a few sheets of blotting paper or newspaper under the fabric in order to assist the block to sink into the cloth, and so give a good print.

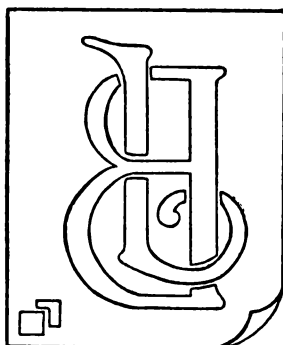
A border is applied to the cover of a hot-water bottle in the same way.

On page 47 linoleum block prints are shown. The design for the monogram is drawn, and a tracing made on a sheet of tracing paper; the paper is reversed, and the design traced on to the linoleum, which has previously been mounted and glued on a wood block, 'type-high', i.e., equal in height to the diameter of a shilling.

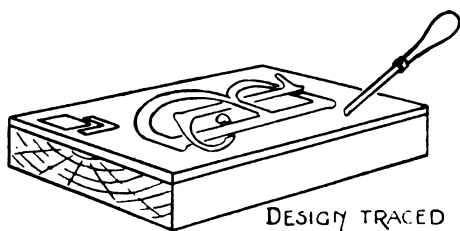
Gouge out the parts that are not required for the print. The portion cut away will be the background, while the remaining portion will represent the printing surface. Take off the print as explained before. Prints can be taken from the block, so long as the edges remain unbroken. Prints from a seascape and an illustration of 'Goosey Goosey Gander' are also shown.



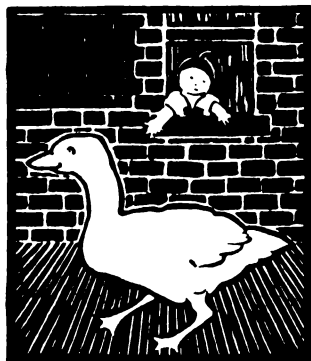
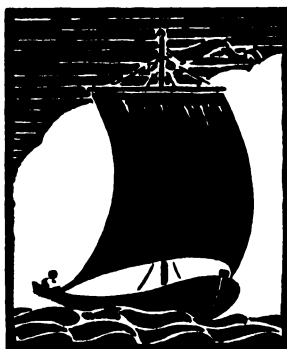
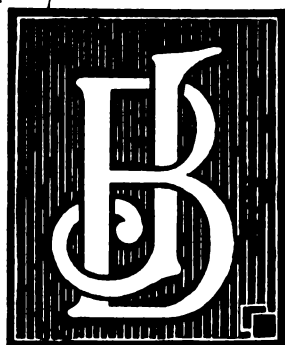
DESIGN DRAWN ON
PAPER



TRACING PAPER REVERSED



DESIGN TRACED
ON LINOLEUM AND
MOUNTED ON WOOD BLOCK
REMOVE WHITE PARTS WITH GOUGES



LINOLEUM PRINTS

STENCILLING

Stencilling is introduced in the lower grades by tracing shapes around a templet, then colouring them with pastels or crayons. As these colours are not permanent, and as the number of materials that can be used is limited, oil colour is recommended as the best medium. This is applied on fabrics with stencil brushes.

Patterns may be composed of geometric, plant, bird, or animal forms. Simple borders for a nursery, bookmarks, small book-covers, table-centres, mats, aprons, bags, cushions, etc., using plant, bird, animal, and other forms, may be executed.

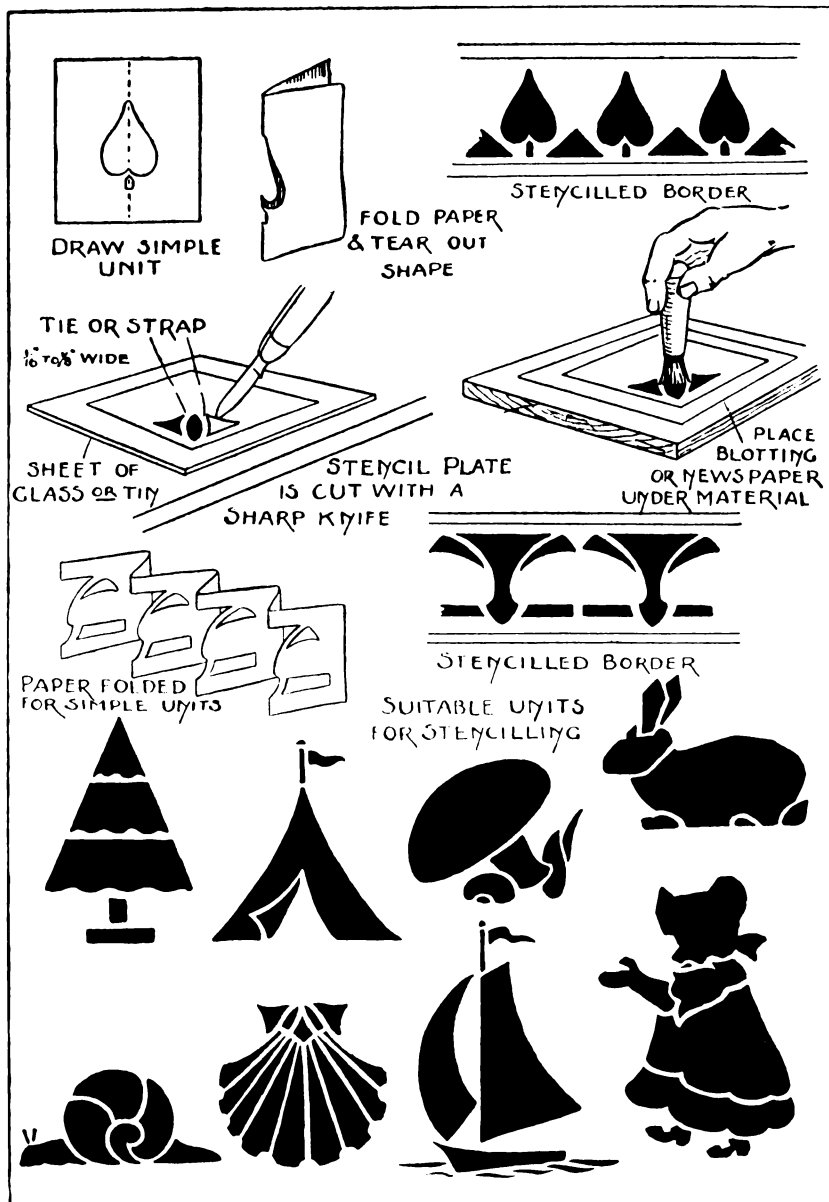
Materials—

Stencil brushes, oil paints (bought in small tubes), sheet of glass, a pliable knife for mixing the paints (an old table knife will be convenient), and a sheet of tough paper for the stencil plate (water-colour paper).

General Directions

If the units are simple in outline, symmetrical, and contain few ties, the paper is folded (see page 49), and the units are cut out in this way. This method saves a lot of cutting, but the designs are limited. The design is drawn on tough paper, and with a sharp knife or razor-blade the shapes through which the colour is to be applied is cut out. The stencil plate is cut on a sheet of glass (see diagram), so that the edges will be sharp and clean. The position and number of ties (narrow bands of paper), which vary from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch wide, are carefully considered, and form part of the design (see diagram). In addition, the ties hold the units of the design together. A stencil plate need not be cut for the whole of a border but for one unit only; then it can be repeated to complete the border. Thus uniform units throughout the design are ensured.

The stencil plate is placed on top of the materials (paper, cardboard, hessian, or fabrics), and is secured by a number of drawing pins on the edge. The selected colours are then taken from the tubes on to a small board or sheet of glass, and, if necessary, are worked into an even paste with a pliable knife. A little turpentine is added if the colour is too thick. A small quantity of colour is then taken on the stencil brush and applied to the material with a light stamping motion. Irregular pieces of paper scraps are placed on top of the plate around the unit to be coloured to prevent the colour from spreading on other parts of the material. If a fine fabric is to be stencilled, a sheet of blotting



paper or several sheets of newspaper should be placed under the fabric to absorb any surplus oil from the colour. In good stencilling the texture of the material is preserved, therefore a thick layer of colour should not be left on the surface.

Child's Washing Apron

A clean sugar-bag is placed on a nail at a convenient height, and cut open with a knife. The material is then pressed and the shape of the apron cut out. This material (hessian) is inexpensive, and being closely woven makes an excellent material for stencilling. A unit for the border is prepared in the form of a stencil plate, which is placed in position on the material, and suitable colours applied. Pocket and tapes are stitched on to complete the apron.

Shopping Bag

Similar material is used for the shopping bag as for the apron.

Two $\frac{1}{2}$ -inch dowels, with the ends lacquered, are inserted at the top of the bag. The hessian is doubled and stitched for the handles. Only one unit is cut out for the stencil plate, and the decoration is applied as before.

Stencilled Clock Case

On the same page, a stencilled decoration is shown for a wooden clock case.



STENCILLED ARTICLES

WEAVING

WEAVING WITH PAPER

Materials—

Paper, coloured streamers, and cardboard.

Weaving is introduced through paper strips, streamers, and paper frames. One 8-inch square of paper is folded into inch strips, and cut into eight separate strips. The second 8-inch square is folded into inch strips, then refolded as shown on page 55, and cut, leaving a 1-inch border around the paper frame. A mat is made by weaving the strips over, and under the slats on the unbroken frame.

In the next mat, the weaving is done with coloured streamers. With the introduction of colour many interesting patterns can be worked out, either on a paper frame or on one made of cardboard.

RAFFIA WORK

Winding

A cardboard tube about $1\frac{1}{2}$ inches long, or an empty gas-mantle box and raffia will be required to make a serviette ring, which is shown on page 55.

The strands are wound closely together, and the raffia is held firmly in the hand at the end of each wind, or the strands will be loose and uneven. The ends of the raffia are hidden between the strands.

A round mat is shown on page 55. A circular piece of cardboard 6 inches in diameter is required, with a hole punched in the centre. The strands of raffia are wound tightly and closely together until the cardboard is covered. Plaited raffia is sewn round the outer edge to complete the mat.

Mat or Wallet—(Page 55)

For a loom, secure a piece of cardboard large enough for the required model. Notch the upper and lower edges (as shown in the diagram). The warp threads begin at the top left-hand corner, come down to the bottom, around the first notch, then return to the top, and continue until the warp threads cover the cardboard. Commence to weave at the top, 'over one, under one,' starting the stitch about 6 threads from the edge of the loom (see diagram). When finished, bend the cardboard and the weaving will slip off. Very effective mats can be made in this way, or the weaving may be folded into three sections, and two of these sewn at the edges to form a wallet, the handles for which can be made of plaited raffia.

Dinner Mat—(Page 55).

A circular piece of cardboard about 6 to 8 inches in diameter is required, with a hole $\frac{1}{8}$ -inch in diameter punched in the centre and an uneven number of notches cut round the circumference to keep the warp threads even on the edge. The cardboard takes the place of a loom. The warp threads are wound through the hole in the centre and over the notch at the edge, till the whole mat is covered. When the warp threads are set, weaving begins round the centre hole, 'over one, under one', working out towards the edge. When both sides of the mat have been woven closely together to the edge, a decorative stitch or plait is added to cover the cardboard rim.

WEAVING WITH RAFFIA**Materials—**

Raffia, cardboard, and either weaving needle or a strong darning needle.

General Directions

In setting up, strong cardboard or a wood frame takes the place of a loom. When cardboard is used, the shape of a bag, wallet, etc., is drawn in outline, and holes are punched at intervals through which the warp threads are set up. To insure a good shape, the setting up must be accurate. The actual weaving is 'over one, under one,' as in darning. Warp threads are joined together by a reef knot (see page 55), but a knot must not be used for joining weft threads. When a weft thread is finished, the new one is joined by overlapping the last three or four stitches. The ends of both stitches are left out, and as the work proceeds these are cut off.

Tea Cosy

Select a piece of cardboard, and on it set out the shape of the tea-cosy and mark the position of the curtain rings at the base. Punch an odd number of small holes on the outline of the cosy, sew the curtain rings on each side of the loom, directly opposite each other, and near the base edge (see diagram). Tie the warp thread to the ring, on the left, then pass it through the first hole to the back of the loom. Carry it up through the ring at the back, and return through the second hole to the ring in front. Continue in this way till the warp threads are set. Then begin to weave round the ring, 'over one, under one', working out towards the edge. A band of coloured raffia will add interest to the tea-cosy. Remove the cardboard loom.

Shopping Bag—(Page 57)**Materials—**

Cardboard, two handles which can be cut from three-ply wood with a fret saw, supply of plain and coloured raffia.

Set out the shape for the bag on the cardboard and punch an odd number of holes $\frac{1}{2}$ -inch apart. On each side of the cardboard place the handles in position (see diagram), directly opposite each other. Attach the handles firmly to the cardboard with fine wire or raffia. Tie thread to the left-hand side of the handle, then pass it through the first hole to the back of the loom. Carry it up through the handle at the back, and return through the second hole to the handle in front. Continue in this way till all the threads are set, then weave in the usual way, "over one, under one", until both sides are covered. Remove the cardboard.

Slippers**Materials—**

Cardboard, a small ring, and raffia.

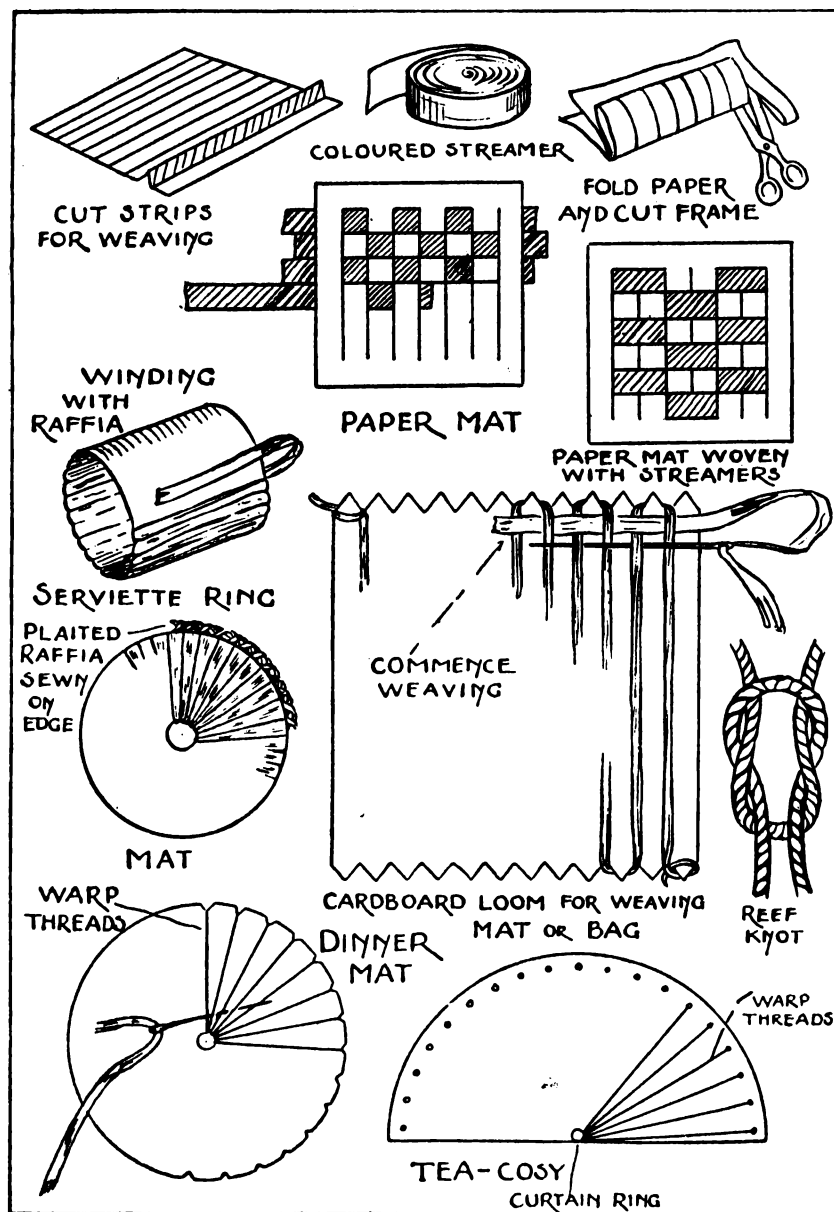
Set out the pattern for the slipper to the required size, and attach the small ring at the curve. Punch the holes at close intervals or notch the edge of the pattern to hold the warp threads in position. The warp threads are set out, and the weaving is commenced (see diagram). When the pair of slippers has been woven, remove the cardboard looms, and mount the woven portions on to felt soles. A tassel to cover the ring is then added.

PLAITING

Another form of weaving is known as plaiting (see page 57). Hats, bags, rugs and belts can be fashioned from plaited raffia (or other suitable materials, such as wool, string, etc.), and sewn in a coil so that the breadths of the plait make the thickness of the rug.

Three-stranded Plait

Tie the ends of 3 strands of raffia or wool, etc., together, and hang then on a nail at a convenient height. Arrange the strands into two groups—two in the right hand and one in the left (see diagram, page 57). Transfer the outside strand (1) in the right hand over (2) to the inside position of the left hand, then the outside strand (3) in the left hand, over (1) on the inside, to the inside of the right hand and continue weaving the outside strand in each operation. This process may be applied to five or other uneven number of strands.



PAPER AND RAFFIA WORK

Five-stranded Plait

Secure 5 strands at the top and arrange them into two groups—3 strands in the right hand and 2 in the left (see diagram). The process commences with (1) the outside strand in the right-hand group. Weave over (2) and under (3) so that strand (1) takes the position (3a) on the left-hand side. Take (1) on the left and weave over (2) and under (3a) on the left hand. Continue in this way, always weaving the outside strand of the larger group, 'over one, under one', till it occupies the inside position on the other side. This method is easier to control than weaving one strand across a plait.

BASKETRY**Materials—****Table-Mat—(Page 57)**

A length of No. 4 cane, raffia, and ply-wood.

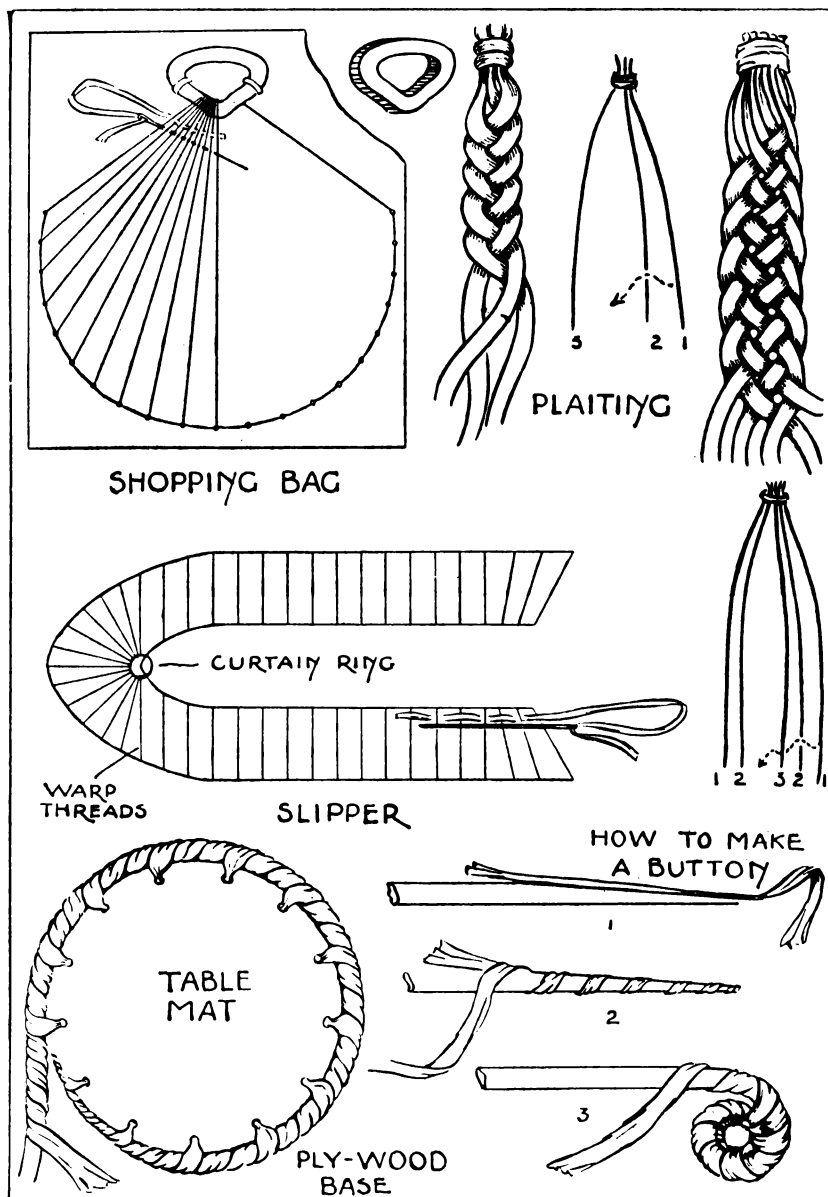
Prepare a ply-wood disk of suitable diameter, and drill holes at $\frac{1}{2}$ -inch intervals near the edge. This disk is used as a centre and the coil is stitched round it. Take a piece of cane and at about 2 inches from one end pare it down to a point. To cover the cane, place the end of a piece of raffia along the pointed end for about 3 inches, then, commencing at the extreme point, wrap the raffia round the cane for a distance of about $\frac{3}{4}$ -inch, winding in the way shown in stage II. Hold the cane firmly against the circumference of the ply-wood, and winding the raffia as before stitch through the holes. For the second and subsequent coils use the squaw stitch as shown on page 59. When the mat is the size required, finish off the coil by paring down the end of the cane as described above. If the thickness of cane is allowed to show on the coil at the finish, a decided lump will be evident.

When the sewing thread becomes frayed or needs renewing, lay the end of a new piece of raffia with the old thread along the cane, wrap the new thread round twice, and continue the work.

Materials—**Cake Basket—(Page 59)**

A length of No. 4 cane, raffia, and a ply-wood base (elliptical in shape).

Drill holes at $\frac{3}{4}$ -inch intervals near the edge of the ply-wood. Prepare the end of the coil as illustrated on page 57. Place the coil on top of the base, flush with the edge, and make a stitch round the cane, immediately above the hole in the base, then through on to the base. To avoid showing portion of the cane where the coil is stitched on to the base, a double stitch is made. Complete the first round in this way, then use the squaw stitch, which is shown on page 59. The sides of the basket may be



RAFFIA AND CANE WORK

vertical, slanting, or curved, according to the use for which it is required. The height of a basket may similarly be varied. The end of the finishing-off coil is worked in the same manner as the end of the first coil, to prevent any lump showing at the finish. Handles can be made by covering the cane with raffia and stitching them neatly to the basket.

Cane Work Basket (Single Weaving or Randing)

Materials—

A circular ply-wood base 6 to 8 inches in diameter, No. 4 or No. 2 cane for the spokes, and No. 2 cane for weaving.

Prepare the ply-wood base with an odd number of holes, which are at $\frac{1}{4}$ -inch intervals and about $\frac{1}{4}$ -inch from the edge of the base. The holes must be big enough to take the cane for the spokes. If the height of the basket is 3 inches, allow 3 inches for the border and 2 inches for the 'foot ridge'—a total of 8 inches (see diagram). Cut the spokes to length, and if the weather is hot and dry, soak the ends for the foot ridge in water. Push the other ends upwards through the holes in the base, leaving a length of 2 inches for the ridge. To fix these ends, take each behind and in front of the next two spokes, and finish to the inside (see diagram). When the foot ridge is completed, weave the basket with No. 2 cane, using the single weaving, i.e., the weaving cane is drawn in and out and between the spokes to the required height (see diagram). An even weave is obtained and the shape controlled by pressing the weaves down over each stake, rather than by pulling the weave from right to left in the direction of the weaving. Pulling the weave is apt to put the basket out of shape. To finish off the basket with a closed border, two rows are necessary. In the first row take each stake round the next end to the outside (see diagram). For the second row push each end through to the inside, going round a stake first. Cut off the ends obliquely on the inside, so that they lie against the weaving.

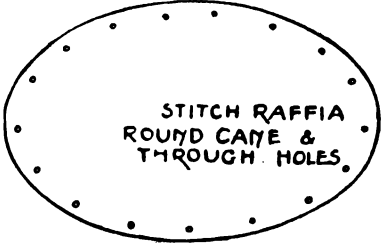
Cane Sandwich-Basket (Pair Weaving)—(Page 61)

Materials—

An elliptical ply-wood base, No. 4 cane for the spokes, and No. 2 cane for weaving.

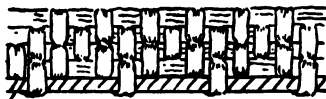
An even number of holes, at 1-inch intervals are drilled $\frac{1}{4}$ -inch from the edge of the base (see diagram). The basket is 2 inches high, therefore the length of a double spoke will be made up of $1\frac{1}{2}$ inches under the base and between the holes, plus 2 lengths of 2 inches for the height, plus two lengths of 3 inches for the trellis border—a total of $11\frac{1}{2}$ inches (see diagram). To arrange the spokes, push one end through a hole to a height of 5 inches, bend over the remainder under the base, and push the other end

CAKE BASKET

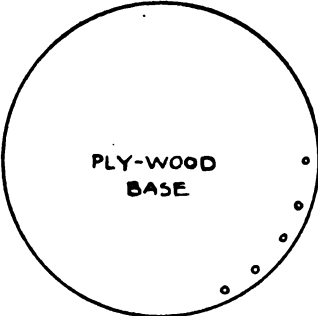


PLY-WOOD BASE

SQUAW STITCH

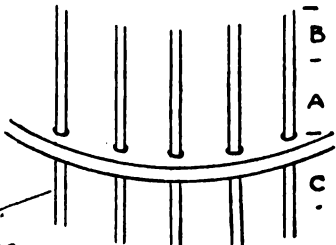


PLY-WOOD BASE



PLY-WOOD BASE

HOLES FOR SPOKES



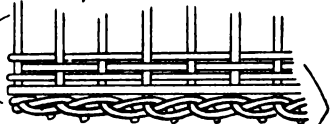
SPOKES
A-HEIGHT OF BASKET
B-LENGTH FOR BORDER
C-LENGTH FOR FOOT RIDGE

SPOKES

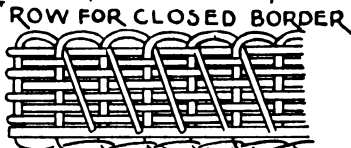
FOOT RIDGE



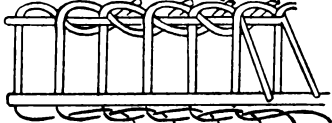
UNDER-SURFACE OF BASE SHOWING FOOT RIDGE



SINGLE WEAVING

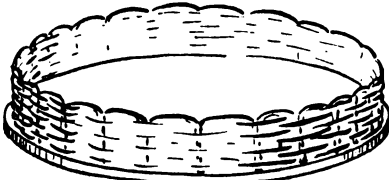


1st ROW FOR CLOSED BORDER



2nd ROW FOR CLOSED BORDER

CUT SPOKES OBLIQUELY ON INSIDE



WORK BASKET

through the next hole to the same height. (The $\frac{1}{2}$ -inch additional length is allowed for the bend of the spoke between the two holes). Pair weaving is used for the basket. Take each weave in turn in front of one stake, behind one stake and to the front. Keep the weave even and the shape controlled by pressing the weaves down over each stake (see diagram). For the border, the spoke is bent at the top of the weave and at the end, then taken in front of the next spoke and inserted down the weave at the second spoke. Continue this weave until the border is complete.

Fruit-Basket (Woven Base)

Real basketry consists of a coil, beginning in the centre and increasing spirally outwards and upwards to a desired shape. The centre or button is shown on page 61. To make the button, soak the cane in water for a few hours, pare down the end to a point, and coil it tightly round a pencil in order to make it curve easily. Wrap the raffia round the cane for a distance of about $\frac{3}{4}$ inch (see diagram), then coil the wrapped end upon itself, making the smallest possible circle. Secure the spiral coil with a stitch. The needle must always be inserted from the front of the work.

Materials—

No. 4 cane for the spokes, and No. 2 cane for weaving.

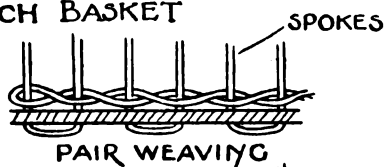
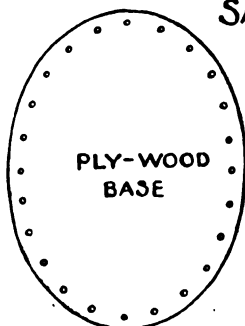
The length of cane required for 8 double spokes is determined by adding the length of the diameter and twice the height of the basket, plus two 3-inch lengths for the border. Diameter 8 inches, height 6 inches, length for border 3 inches; length required, 26 inches for a double spoke and 13 inches for the extra single spoke.

Place four double spokes in the centre and at right angles to the other four, and tie firmly (see diagram). The weaving cane is then woven 'over four, under four'. Next divide the spokes into pairs, by weaving 'over two, under two', finally separating pairs so that they radiate as single spokes. At this stage insert the odd spoke and continue to weave 'over one, under one', until the base is woven. Moisten the spokes and bend them to the required shape. The weaving continues in and out till sufficient length of spoke remains for the border. Finish the basket with a trellis border.

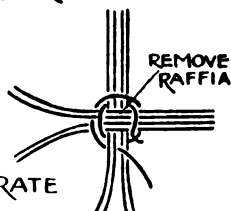
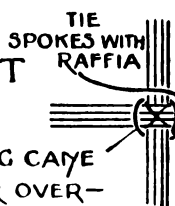
Tablet Weaving—(Page 63)

Tablet weaving is done by means of a number of small straw-board tablets, which take the place of a wood loom. This form of weaving was first practised by the Arabs during their journeys across the desert on horseback, and is now used in many European countries. Many interesting patterns can be woven in order to make belts, girth-bands, braids, etc. The width of the article is determined by the number of tablets used.

SANDWICH BASKET

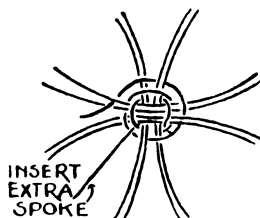


FRUIT BASKET

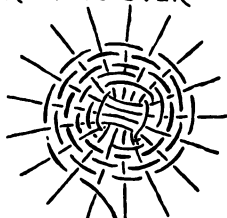
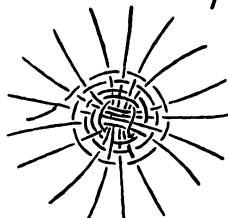


WEAVING CAGE
IS WOVEN FOUR OVER-
FOUR UNDER

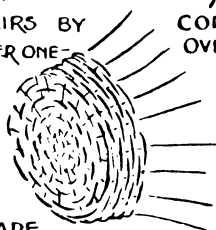
SEPARATE
SPOKES INTO
PAIRS BY WEAVING TWO
UNDER- TWO OVER



SEPARATE PAIRS BY
WEAVING UNDER ONE-
OVER ONE



MOISTEN
SPOKES &
BEND TO SHAPE



WEAVE OVER ONE-UNDER ONE



FINISH WITH TRELLIS BORDER

Materials—

Strawboard, wool, or thread, or string, and a comb, or a ruler or a paper-knife.

The strawboard is cut into square tablets with sides $1\frac{3}{4}$ inches long. Two holes about $\frac{1}{8}$ inch in diameter are drilled or punched with a leather punch in each tablet as shown in the diagram. The warp threads are taken through the holes in each tablet and are tied at the ends to a pole or hung on a hook to keep the strands taut. The holes in each tablet are marked (a) for the top hole, and (b) for the bottom hole (see diagram).

Any number of tablets can be used, but for the pattern illustrated on page 63 seven tablets are used, giving fourteen strands. This pattern is set out on squared paper at the bottom of the page referred to.

For the 'setting up', warp threads are threaded through the holes (a) and (b) in No. 1 and No. 7 tablets with blue strands; through holes (a) and (b) in No. 2 and No. 6 tablets with green strands; through holes (a) only in No. 3 and No. 5 tablets with blue strands; and through holes (b) in the same tablets with green strands; through hole (a) only in No. 4 tablet with a green strand, and through hole (b) in the same tablet with a blue strand—a total of 14 strands.

The weaving or weft thread is blue and is wound on to a shuttle (see diagram). The shuttle takes the place of a needle and is made of thin wood or strawboard about $3\frac{1}{2}$ inches long by $1\frac{1}{4}$ inches wide. The ends of the strands are tied tightly at the ends (see diagram).

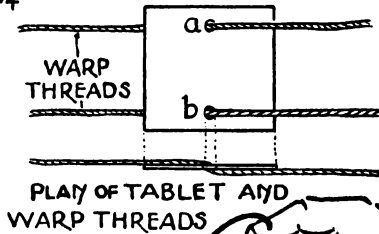
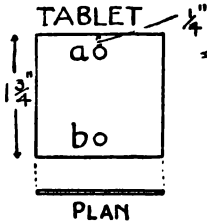
A 'shed' is formed between a line of warp threads passing through holes (a) and another line of threads through holes (b). The shuttle is passed between the lines of warp threads ('shed') from front to back and vice versa (see diagram).

Commence weaving at the left-hand end by passing the shuttle from the near side between the line of warp threads to the other side (see diagram). To change the 'shed' for the return weaving thread, reverse each tablet singly, commencing from tablet No. 1 (see diagram) until all tablets are reversed, so that holes (a) are at the bottom on all tablets. With a comb or ruler, beat up the warp threads, then pass the shuttle through the 'shed' to the front. Beat up the weave. To make the next 'shed', turn each tablet back singly to its original position, with holes (a) at the top. Beat up the threads and pass the shuttle through the 'shed' to the far side. Continue in this way until the weaving is completed.

Another pattern can be woven on the same 'setting up'. Pass the shuttle through the first shed, then reverse all the tablets,

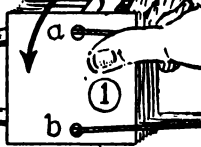
TABLET WEAVING

SHUTTLE



ATTACH WARP
THREADS TO A HOOK OR
POLE

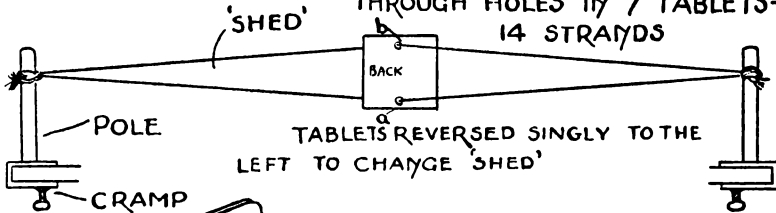
'SHED'



TURN TABLETS
SINGLY

WIND WEAVING OR WEFT
THREAD OF SHUTTLE

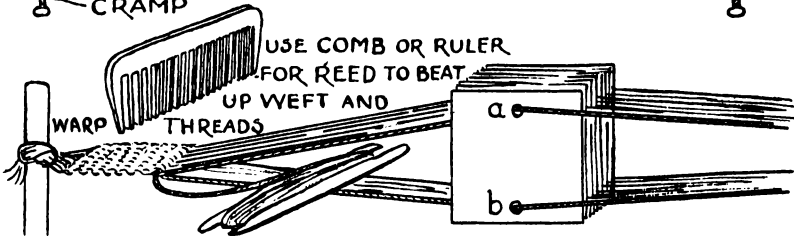
COMPLETE 'SETTING UP' BY
THREADING WARP THREADS
THROUGH HOLES IN 7 TABLETS—
14 STRANDS



POLE

CRAMP

TABLETS REVERSED SINGLY TO THE
LEFT TO CHANGE 'SHED'

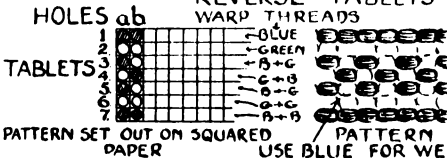


USE COMB OR RULER
FOR REED TO BEAT
UP WEFT AND

WARP
THREADS

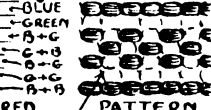
WEAVE FROM LEFT TO RIGHT - THEN

REVERSE TABLETS IN OPPOSITE DIRECTION.



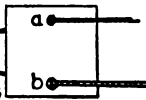
HOLES ab

WARP THREADS



TABLET
No 1

BLUE
WARP THREADS



as in the previous pattern, with holes (a) at the bottom, then pass the shuttle through the shed to the front. Beat up weave. Next, turn all the tablets singly in the same direction as the first movement of the previous pattern for a 'shed'. Continue for another two stitches (four in all). The warp threads at the right-hand end at this stage will be twisted, but, with the tablets reversed in the opposite direction for the next four stitches, the tablets and warp threads will resume their normal positions. Repeat the movements, which are 4 turns of all tablets (singly) to the left, then 4 turns of all tablets (singly) to the right.

WEAVING ON A HAND LOOM

How to Make a Hand Loom

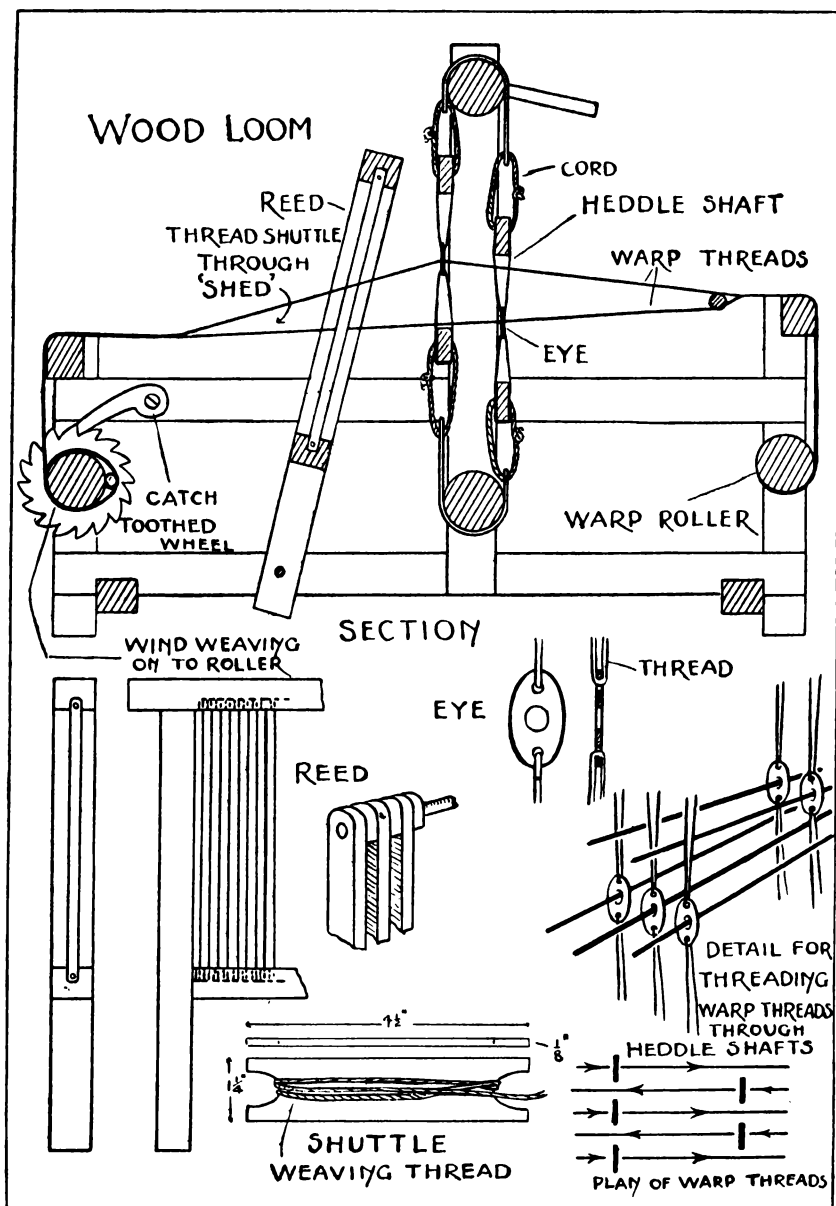
Reed.—This section of the loom is used for beating up the weft threads, so that the weave will be uniform and the individual threads close together. The reed is made on the same principle as an ordinary comb, but with more teeth or bars. There must be at least as many teeth as there are warp threads. In stringing or setting up the warp, threads are taken through the spaces of the reed.

To make a reed, thin strong pieces of wire $4\frac{1}{2}$ inches long, or thin strips of metal $\frac{1}{8}$ -inch wide, and $4\frac{1}{2}$ inches long, can be inserted into the top and bottom rails of the frame (see diagram).

Heddle.—The heddle consists of two horizontal cross-bars of wood, $\frac{3}{4}$ -inch by $\frac{1}{4}$ -inch, joined by a number of strong threads. In the centre of each thread is a small metal 'eye' (see diagram) with a hole in the centre large enough to take a warp thread.

Two heddles are necessary in a hand loom. Alternate warp threads are put through the holes of one heddle and then passed through the space between the metal 'eye' of the second heddle, while the threads passed back through the holes of the second are threaded through the space between the metal 'eye' of the first (see diagram). The heddle shafts are suspended from the top rod of the loom and tied to a corresponding rod at the base. By lifting the heddles alternately, two different sets of threads are raised, forming two sheds, which are necessary for the weaving. By using extra heddles various patterns can be woven.

Shuttle.—For weaving on cardboard looms, a needle is used for the weft threads, but with hand looms longer threads are required, therefore the shuttle takes the place of a needle (see diagram). Weaving is done with the shuttle, which passes through the 'shed' from right to left over one set of warp threads, and on the return, through the 'shed' from left to right, over the other set of warp threads. Alternate warp threads are raised by moving the heddle shafts to form a 'shed'.



HAND LOOM

HANDWORK IN WOOD

INTRODUCTION

Stripwork of which the pot-stand given below is an illustration, consists of making simple toys or objects from strips of wood varying in size. The simple nature of the work, together with the small equipment and the absence of keen-edged tools (marking out being done with a pencil) makes it suitable for boys in Grade IV. It entails measuring, marking, cutting off, joining, and finishing. It can be worked in an ordinary classroom if the desks are fitted with a movable top and a saw board.

Wheels for toys can be cut with a $1\frac{1}{4}$ -inch bit, with the horizontal cutter filed away.

THE WOODWORK ROOM

If a spare room is not available, the shelter pavilion might be used.

A movable type of bench is most suitable. It need not be elaborate. A stout board from 15 inches to 18 inches wide and about 1 inch thick, placed on trestles 26 inches to 30 inches high and bolted to keep it in position is satisfactory. A bench 18 feet long will accommodate 16 to 18 boys working 8 or 9 on each side. The old type of desk can be used as a bench, provided the top is levelled.

The tools, preferably rolled in tool-holders in sets, should be carefully stored in a store-room or press.

Equipment—

Work-bench or desks fitted with movable top; saw board; mitre board.

Timber—

Pine strips of the following widths and thicknesses:— $3\frac{1}{4}$ inches \times $\frac{1}{4}$ inch; $\frac{1}{2}$ inch \times $\frac{1}{2}$ inch; $\frac{1}{2}$ inch \times $\frac{1}{4}$ inch; and $\frac{1}{2}$ inch or $\frac{3}{8}$ inch \times 1 inch. Other sizes recommended are:— $\frac{1}{4}$ inch \times $\frac{1}{8}$ inch; $\frac{1}{2}$ inch \times $\frac{3}{8}$ inch; $\frac{1}{4}$ inch \times $\frac{1}{4}$ inch; $\frac{3}{8}$ inch \times $\frac{3}{8}$ inch. Other materials that will be found useful are dowelling, sticks, broom-handles, cotton-reels, packing cases, 3-ply tea boxes, butter boxes, wire, cigar boxes, tins (all shapes), plasterers' laths, 3-ply sheets, meat skewers, wood from the centre of a roll of linoleum, boards about which material is wrapped, confectionery boxes, etc.

Tools—

Small dovetail saw, hammer, square, fretsaw, fine bradawls, pincers or pliers, screwdriver, sandpaper, wire nails and screws, liquid glue.

Extra tools:—Files, plane, oil-stone, brace and bits, spokeshave, hand saw, tenon saw, bow saw, and chisels ($\frac{1}{4}$ inch and $\frac{1}{2}$ inch).

Pot Stand

A simple pot stand is made from oregon plasterers' laths, with 2 pieces of pine 1-inch square for the supports. From a lath saw off 4 pieces 6 inches long and 2 lengths of 1 inch by 1 inch pine, also 6 inches long. Place the strips across the supports, and space them evenly, allowing a 1-inch projection on each side. Nail the pieces together with $\frac{3}{4}$ -inch fine wire nails.

Signal

A 12-inch length of pine 1 inch by 1 inch for the post, and a 4-inch piece of lath for the arm are required.

Measure 1 inch from the end and square a line round the post; saw off the two triangular pieces to complete the top.

The ends are sawn off one end of the arm to a length of 1-inch. At a distance of 2 inches from the top of the post nail on the cross-piece for the arm to complete the signal.

Garden Peg (Square)

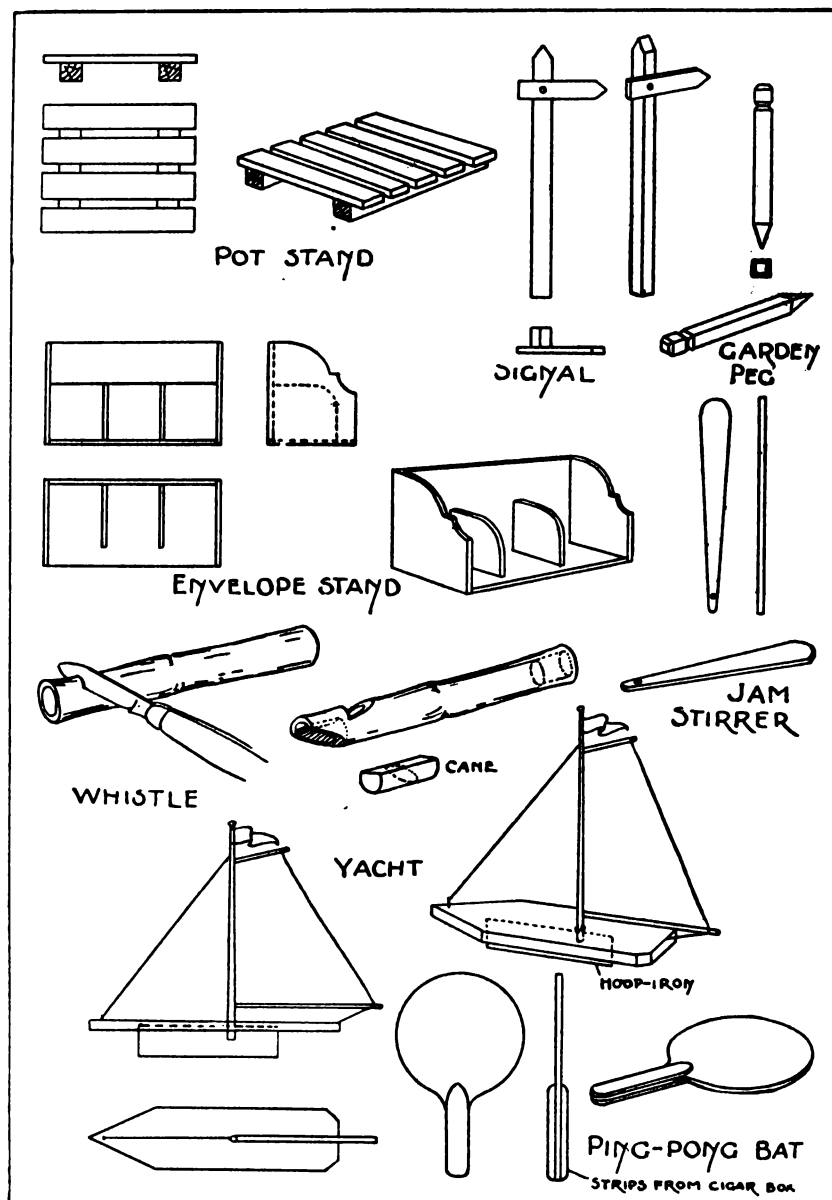
Saw off a piece 8 inches long, of 1-inch by 1-inch timber, and square-off lines on the four faces at 2 inches from one end, $\frac{1}{4}$ inch and 1 inch from the other end. Point off the end with a chisel or knife, and shape the other end as shown in the diagram.

Envelope Stand

The envelope stand shown on page 69 is made from a large cigar box. The lid, front, and two ends are removed, without splitting the wood. Draw the shape of the ends as shown in the diagram and cut out with the fretsaw. Replace the shaped ends. From the front of the box the two division pieces are cut, and then are placed into position and nailed from the back and base.

Jam Stirrer

Select a piece of board 2 inches wide, $\frac{5}{8}$ -inch thick, and 12 inches long. The outline of the stirrer is set out, with the sides tapering from the 2-inch end down to $\frac{1}{2}$ -inch at the other end. Shape the model, and drill a small hole at the end.



WOODWORK

Whistle—(Page 69)

The whistle is made from a bamboo or cane 4 inches to 6 inches long. Shape the mouthpiece and the hole with a sharp knife. The hole is 1 inch from the end, and is vertical at the front section. A length of cane $\frac{3}{4}$ -inch long, with a $\frac{1}{8}$ -inch horizontal section removed, is placed in the mouthpiece. Cut the cane to the shape of the mouthpiece, then insert a short length of cane to fit tightly at the other end.

Model Yacht

A board 14 inches by 5 inches and 1 inch thick is shaped for the hull. For the plate or keel, a 9-inch saw kerf or cut is made to hold a stout piece of hoop-iron. A $\frac{1}{2}$ -inch dowel, 18 inches long, is suitable for the mast, which is fitted into the hull after a $\frac{1}{2}$ -inch hole has been bored to receive it. The boom and gaff are tacked on to the mast, then the mainsail is added. A cord is tied from the mast to the bow, and a pennant is added to complete the yacht.

Ping-Pong Bat

Three-ply wood of good quality 11 inches square, and two strips from a cigar box 6 inches by $1\frac{1}{2}$ inches are required. Draw the outline of the bat by describing a 7-inch circle for the blade. The handle is a strip 4 inches long and $1\frac{1}{2}$ inches wide. A tenon saw is used to cut along the sides of the handle, and a bow-saw or fret-saw for the blade. Shape the strips of wood from the cigar box, and glue them firmly to each side of the handle, which is rounded on the edges with a file and glasspaper (commonly called sandpaper).

Rounder Bat—(Page 73)

A piece of wood 14 inches by 5 inches by $\frac{3}{4}$ -inch is shaped, allowing 9 inches for the blade, and 5 inches for the handle. Cut down each side of the handle with a tenon saw to the curves, then finish with the bow-saw, which is also used to round off the end of the blade. Pare down the handle with a spokeshave, chisel, or knife, until it is circular in section. Finish with glasspaper.

Fish Scaler—(Page 73)

A rectangular piece of wood 11 inches by 2 inches by $\frac{1}{8}$ -inch is required. The handle is 4 inches long, and is shaped with a bow-saw or knife. On the blade fix six bottle tops with $\frac{1}{2}$ -inch screws, leaving the jagged edges uppermost.

Butter Pat—(Page 73)

Select a 9-inch length of white pine, $3\frac{1}{2}$ inches wide and $\frac{3}{8}$ -inch thick. The handle, which is shaped with a bow-saw, is $3\frac{1}{2}$ inches long and $1\frac{1}{2}$ inches wide. Saw off the sharp corners, and bevel the edges on the underneath surface to about $\frac{1}{8}$ -inch thickness. The grooves on the surface are gouged out, and the model is finished with glasspaper to remove all sharp edges.

Butter Stamp

A piece of kauri pine 5 inches by $3\frac{1}{2}$ inches by 1 inch thick, and a short length of timber $1\frac{1}{2}$ inches square, are required. Bevel the edges of the kauri pine timber with a plane or spokeshave, and draw on the surface the shape of the brand. An anchor is illustrated on this stamp. Use a punch or a 6-inch nail with the point filed off, and a hammer to beat down the surface of the wood. The brand will then show in relief. Shape the handle, which is glued and screwed on to the stamp.

Boot Scraper

Two pieces of hardwood 9 inches by 3 inches by 2 inches, and four pieces of stout hoop-iron 8 inches long, are required. Place the two timbers together and set out the position of the hoop-irons. Cut the saw kerfs, and with a hammer force the hoop-irons into the timbers.

Pipe Rack

The timber is 12 inches by 4 inches by $\frac{1}{2}$ inch. Saw off an 8-inch length for the back. Set out the shape; the position for the $\frac{1}{2}$ -inch housing joint, which is cut with a $\frac{1}{2}$ -inch chisel. The 4-inch length is cut to shape. Bore two holes $\frac{3}{4}$ of an inch in diameter to hold the pipes. A small hole is drilled in the back, and the joint glued and nailed.

Book Trough

The two end pieces are cut from timber 16 inches by 8 inches by $\frac{3}{4}$ inch, while the two rails are 18 inches long, 3 inches and 4 inches wide, and $\frac{1}{2}$ inch thick. The ends are shaped with a saw, and the rail-joints are housed into the ends to a depth of $\frac{3}{8}$ of an inch. The angle between the rails is a right angle. Force the rails into the joints, which are glued and nailed.

Ferret Box

The dimensions of the box are 15 inches long by 7 inches wide by 6 inches high. A small packing case is suitable, if the wood is $\frac{1}{2}$ -inch to $\frac{3}{8}$ -inch thick. The ends are sawn to shape, leaving 3 inches for the front, and 4 inches for the top. The lid is 15 inches long by $4\frac{1}{2}$ inches wide, and hinged to the top with small butt hinges. Ventilation is provided at both ends by drilling eight $\frac{3}{8}$ -inch holes. Attach a strap or plaited cord to the back of the box. A short length of leather strap is screwed to the lid and fastened over a small screw through a hole bored in the strap.

Bobs Set—(Page 75)

Materials—

One piece 24 inches by 5 inches by $\frac{1}{2}$ inch for the front; one 22 inches by 3 inches by $\frac{1}{2}$ -inch, and five 7 inches by 3 inches by $\frac{1}{2}$ -inch for the back and partitions; two 11 inches by 2 inches for the hinged arms.

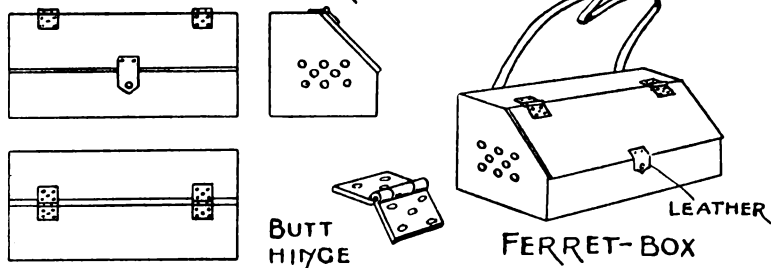
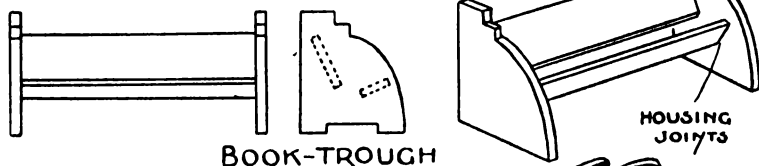
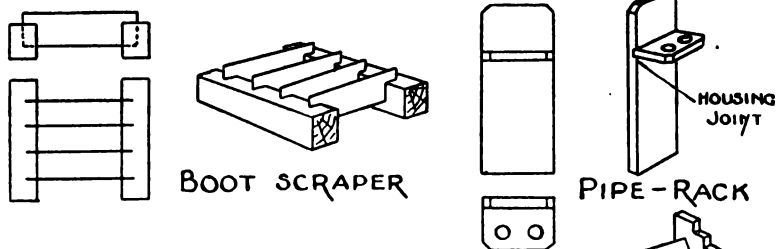
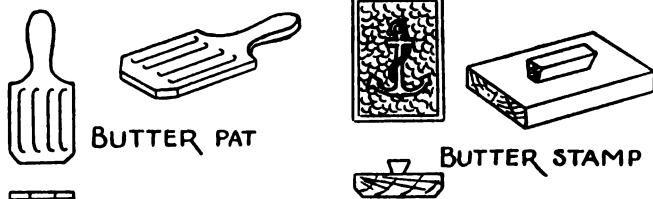
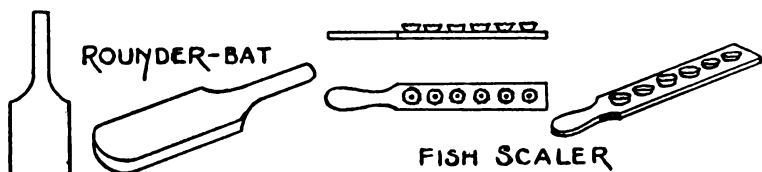
Draw the shape of the front of the set on the 5-inch board, and the positions of the openings, which are just wide enough to allow the ball to pass through. Cut to shape. The partitions are built up as shown in the illustration, and securely attached to the back of the board. If sufficient timber is available, a partition can be allowed for each opening. The two arms are joined to the front of the set with a pair of butt hinges, which allow the arms to be folded when not in use. The cue, which is 2 feet 6 inches long, is made from a broom handle, and tapered down with a plane and spokeshave to a $\frac{1}{4}$ -inch or $\frac{3}{8}$ -inch circle at the end. Smooth the surface of the cue with glasspaper.

Folding Stool

Materials—

Four pieces of pine or hardwood 18 inches by 2 inches by 1 inch; two pieces 14 inches by 2 inches by 1 inch; one broom handle, out of which two rails 13 inches long are sawn; two bolts $2\frac{1}{2}$ inches by $\frac{1}{4}$ -inch; canvas or duck for the seat.

At the end of each support, and from the 1-inch face, cut a housing joint 1 inch deep to hold the top rails. Three inches from the other ends, drill holes on the 2-inch faces to take the bottom rails, and in the centre another set of $\frac{1}{4}$ -inch holes for the bolts. All rails are placed together on top of the bench, and measurements are transferred to each other with a square. This method ensures the same measurement on each timber. Pair the supports, so that the holes for the bottom rails face inwards, and bolt them together with the head of the bolt towards the outside.



The top rails are glued, then placed in their supports, and screwed; at the same operation the corresponding bottom rails are fixed in position. Wind the fabric round the top rails, and secure it with $\frac{3}{4}$ -inch domed-tacks.

To cut the ends of the supports, so that the stool will be firm, stand the stool on a flat surface, and place a board about 1 inch to $1\frac{1}{2}$ inches thick against the face of two supports, then draw a pencil line along the top edge of the timber. Repeat on the other supports (see diagram), and saw off along the pencil lines.

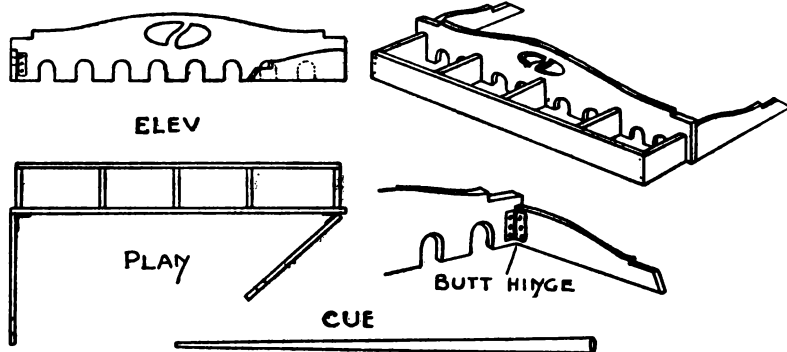
Folding Chair

Materials—

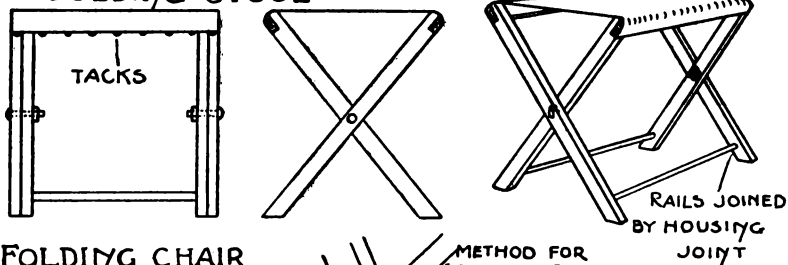
Blackwood, hardwood, or pine is suitable timber for this model. Two pieces 3 feet by $1\frac{1}{4}$ inches by $\frac{3}{4}$ -inch; two 2 feet by $1\frac{1}{4}$ inches by $\frac{3}{4}$ -inch; two $13\frac{1}{2}$ inches by $1\frac{1}{2}$ inches by $\frac{3}{4}$ -inch; one 13 inches by $1\frac{1}{4}$ inches by $\frac{3}{8}$ -inch; seven 1 foot 4 inches by $1\frac{1}{4}$ inches by $\frac{3}{8}$ -inch; four $16\frac{1}{2}$ inches by 4 inches by $\frac{3}{8}$ -inch; four bolts, 2 inches by $\frac{1}{4}$ -inch; two bolts, $2\frac{1}{2}$ inches by $\frac{1}{4}$ -inch.

At the end of each long timber, cut two housing joints 4 inches long by $\frac{3}{8}$ -inch in depth, for the back rail, and drill $\frac{1}{4}$ -inch holes in each timber 12 inches from the other end. The two pieces of timber 2 feet long are rounded at one end (see diagram), and two $\frac{1}{4}$ -inch holes drilled in each timber; the first hole $\frac{3}{4}$ -inch from the rounded end, and countersunk with a $\frac{3}{4}$ -inch German centre bit to a depth of $\frac{3}{8}$ -inch (see diagram); while the second hole is $8\frac{1}{2}$ inches from the same end. At a distance of 3 inches from the ends of the timbers which are $13\frac{1}{2}$ inches long, drill a $\frac{1}{4}$ -inch hole 1 inch from the long edge. This distance from the edge allows the rounded end of the support to move under the projection of the slats (see diagram). Cut a $\frac{1}{2}$ -inch bevel at the ends (see diagram). Build the seat with seven slats, six pieces 16 inches by $1\frac{1}{4}$ inches by $\frac{3}{8}$ -inch, and one piece 13 inches by $1\frac{1}{4}$ inches by $\frac{3}{8}$ -inch, which is placed at the back of the seat. The width is 10 inches between the two seat rails. Drill two $\frac{1}{4}$ -inch holes through the back slats and the rails (see diagram). The supports are paired and braced together with 2-inch bolts. Screw the top and bottom rails in position, with a width of 13 inches between the long supports, and attach the seat, using the 2-inch bolts, with the domed head placed in the countersunk rail (see diagram). The 16-inches by $1\frac{1}{4}$ -inches by $\frac{3}{8}$ -inch slat is bolted under the seat at the back (see diagram). The remaining $16\frac{1}{2}$ inches by 4 inches by $\frac{3}{8}$ -inch board is screwed on to the back of the long timbers. This timber is known as a stop, and holds the seat in a normal position (see diagram).

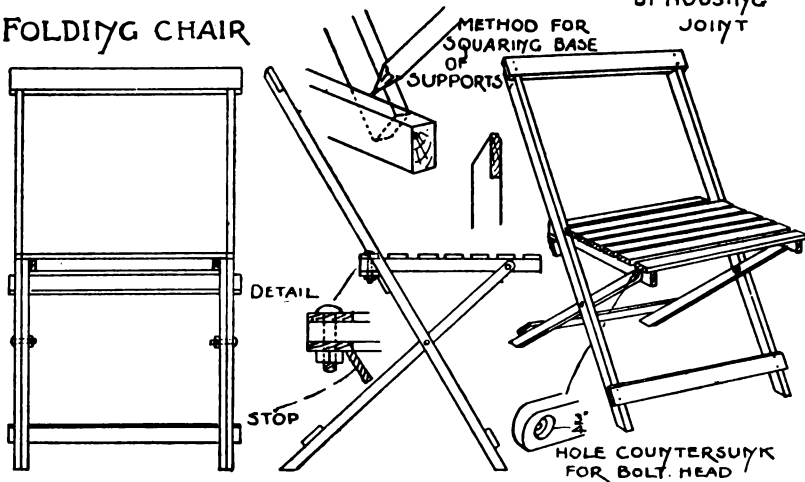
BOBS-SET



FOLDING STOOL



FOLDING CHAIR



Skirt Board

A skirt-board is shown on page 77, with a support which allows it to rest on the end of an ordinary table.

The top is made from pine timber, 3 feet 6 inches long, 12 inches wide at one end, tapering to $6\frac{1}{2}$ inches at the other end, and 1 inch thick. A length of 2 feet 6 inches by 4 inches by 1 inch for the support, and a short piece 6 inches by 3 inches by 2 inches is halved to a distance of 3 inches at one end, and screwed at the other end to the undersurface of the top, to form a key which holds the support in position when it is folded under the top. The top is shaped with a hand and bow saw, and the support is attached to it by a butt hinge about 3 inches from the end. The key, which revolves on the screw, is placed at a distance of 2 feet $9\frac{1}{2}$ inches from the hinge.

Towel Rail

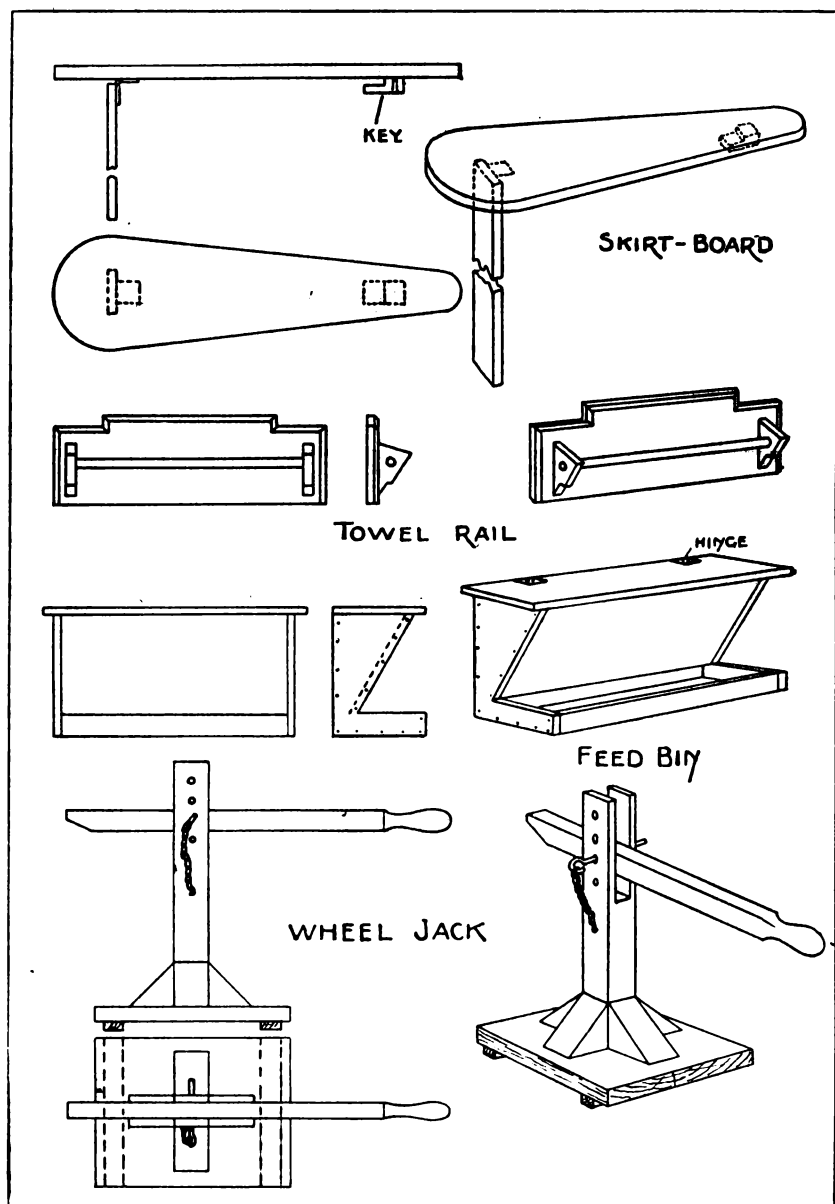
Timber required:—One piece of pine 18 inches by 6 inches by $\frac{3}{4}$ -inch; two 4 inches by $3\frac{1}{2}$ inches by 1 inch, and a round rod, 16 inches long and $\frac{1}{2}$ -inch to $\frac{3}{4}$ -inch in diameter. Shape the back and brackets as shown in the illustration. Holes are then bored to a depth of $\frac{1}{2}$ -inch to hold the rails, which are glued in position. Place the brackets in position on the timber, and secure them firmly with screws through the back.

Chickens' Feed Bin

A petrol case is required for this model. The top and front of the case are removed without splitting the timber. On the end, square a line across the face 3 inches from the base, and on this line mark a point 6 inches in from the front edge, and join to the top front corner. This triangular shape is removed on both ends with a hand saw. The boards from the front of the case are nailed to the sloping face, while a board 3 inches wide by $\frac{3}{4}$ -inch is nailed to complete the front of the feeding tray. The lid is built up, and strengthened by two strips of wood nailed on the inside face. Two strips of leather 4 inches long and $1\frac{1}{2}$ inches wide will make satisfactory hinges if screwed firmly to the top and back.

Wheel Jack

This model will be found useful on a farm. It is made from hardwood. The timbers:—Two pieces 14 inches long by 6 inches by 1 inch for the base; two 14 inches by 2 inches by 1 inch for the cleats at the base; one 2 feet 6 inches by 4 inches square for the post; one 2 feet 3 inches by 3 inches by 2 inches for the lever; one iron pin $\frac{3}{8}$ -inch in diameter and 6 inches long.



The base is built up, and the cleats are fixed to the bottom with screws. The post is fixed into the base by a housing joint, $\frac{1}{2}$ -inch in depth, and supported by blocks, which are glued and nailed to the base and post. A slot for the lever is 2 inches wide and 8 inches deep; four holes $\frac{5}{8}$ -inch in diameter are bored through each side, corresponding with one another, in order to carry the pin, which adjusts the height of the lever. The end of the timber for the lever is shaped, and three holes are bored in it to take the $\frac{5}{8}$ -inch pin. A small chain through the eye of the pin is attached to the side of the post.

Folding Table

This small table will be convenient for campers, as it can be folded into a small space. It is made from pine. The top is 21 inches square by 1 inch thick; four pieces of timber 2 feet 10 inches by $1\frac{1}{2}$ inches by 1 inch for the supports; two 19 inches by $1\frac{1}{2}$ inches by 1 inch for the frame under the top; two 17 inches by $1\frac{1}{2}$ inches by 1 inch, and two 15 inches by $1\frac{1}{2}$ inches by 1 inch for the rails; one piece 12 inches by 1 inch by 1 inch for a 'stop'; two bolts, $2\frac{1}{4}$ inches by 1 inch.

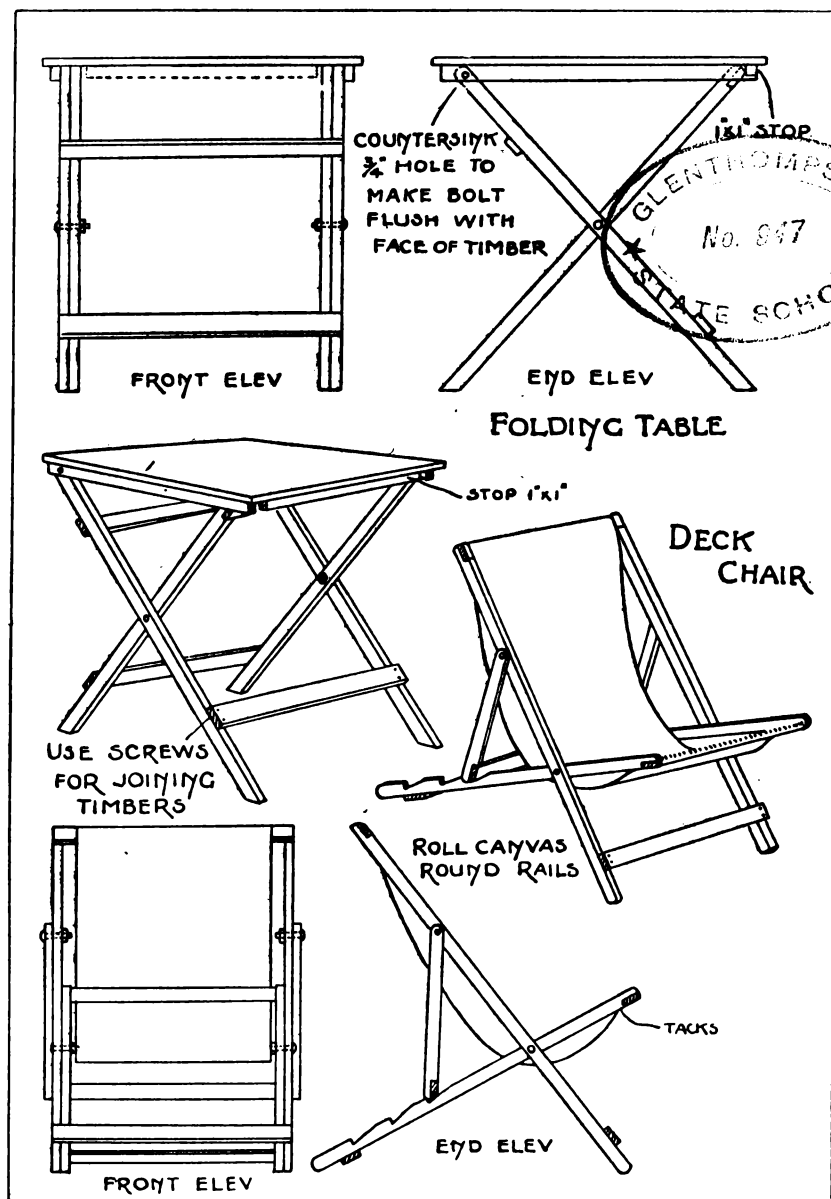
Round the ends of two long supports, and bore $\frac{1}{4}$ -inch holes (see diagram). On the other two long supports house a joint for a rail (see diagram). The crossed supports are joined by bolts 18 inches from the base. The two timbers for the frame are attached to the top 1 inch from the edges, after a $\frac{1}{4}$ -inch hole has been bored 1 inch from the end and 1 inch from the upper edge. Screw the rails into position and bolt the crossed supports to the frame at two ends. Then screw the 'stop' in position as shown in the diagram. All holes bored for the bolts are counter-sunk, so that the domed heads are flush with the face of the timber. Otherwise the table will not fold.

The use of screws is recommended in all woodwork.

Deck Chair

All timbers are $1\frac{1}{2}$ inches wide and 1 inch thick; two pieces 4 feet 6 inches long; two 3 feet 6 inches; two 2 feet 6 inches; two rails, 18 inches; two rails, 20 inches; one rail, 24 inches; canvas or duck; four bolts, $2\frac{1}{4}$ inches by $\frac{1}{4}$ -inch.

Prepare the timbers for the rails, and drill holes on the long timbers 1 foot and 2 feet 6 inches respectively from the ground. The ends of the timbers on the ground are rounded to prevent the chair from slipping. The bottom rails are 3 inches from the ends. Wrap the canvas round the rails, and secure it with $\frac{3}{4}$ -inch round-headed tacks. The back supports are notched as shown in the diagram, to hold the back rail.



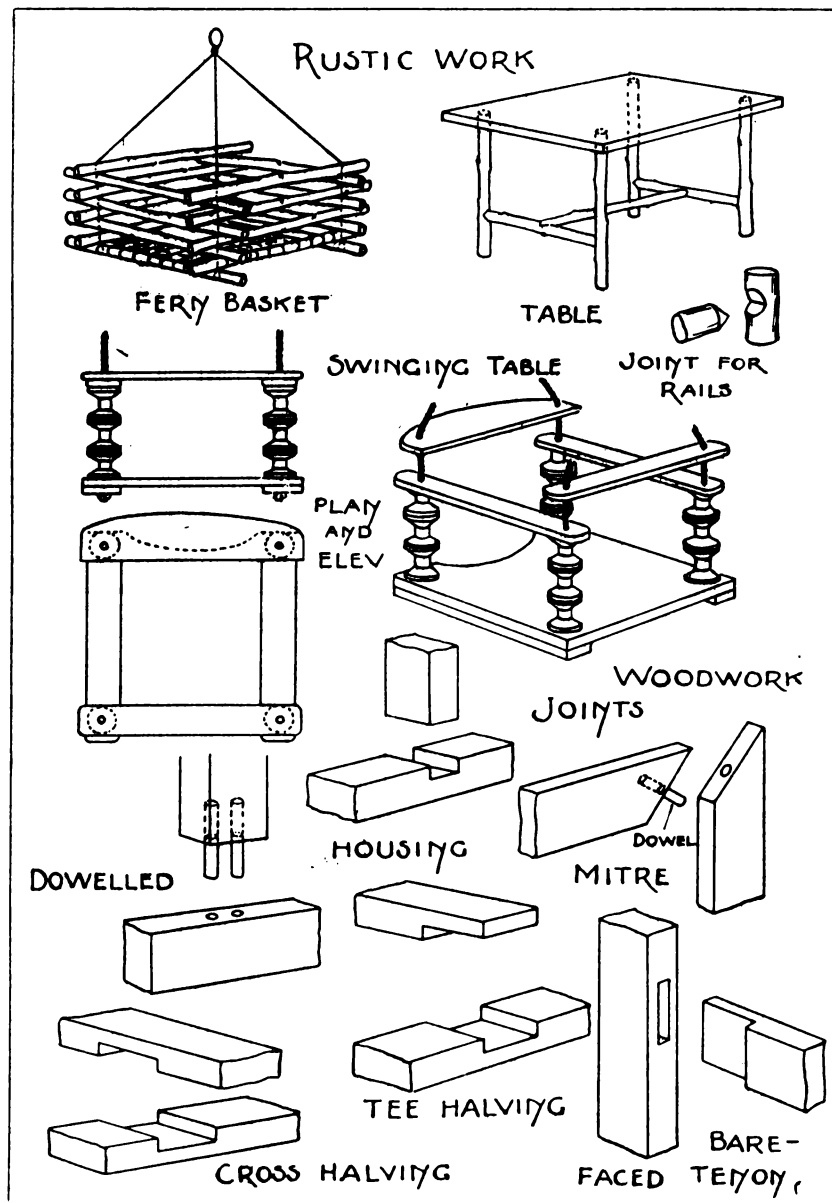
Child's Swinging Table

The base is made of pine, and is 13 inches square; two cleats, 13 inches by 2 inches by $\frac{1}{2}$ -inch, are screwed to the base. A curved section is cut out of the front of the base, and holes are bored at each corner. Through each hole pass a rope, which has been knotted at the ends. Thread cotton reels of uniform height on the ropes. Three top rails 2 inches by $\frac{1}{2}$ -inch are prepared and threaded on the rope. The front board, which is shaped for the table, is 6 inches by $\frac{1}{2}$ -inch. The ropes are tied together at a convenient height.

Other Articles

Following is a Suggested List of Models for Woodwork—

Building blocks (sawn from pieces square in section); picture post-card frame and cigarette card frame (fret-sawn from 3-ply or cigar box, or made from stripwood); calendar, toy trucks, toy ladder, trolley, and toy table (stripwood, laths, etc.); envelope stand (3-ply confectionery box); porter's truck; drum sticks and flower-pot sticks (rounded and shaped by knife from suitable stick); dibble (round stick cut to size, one end sharpened, other end trimmed and finished); whip handle (cut from blackwood, red-gum, or hardwood, filed and glasspapered); whip top (cut length from round wood, such as centre of linoleum roll, drive in nail one end, sharpen to nail and finish off); kite frame (paling pieces cut, then bound with string, nick for string on outside); yo-yo (cotton reels); buzzing-bee frame (lath or kerosene-case wood nicked on either side, hole for string to swing); doll's house (boxes); simple furniture (laths or strips, etc.); constructional toys, e.g., meccano and tinker toy; paper knife (simple flat piece of thin wood, nick for handle and pare to an edge and shape); coathanger; door wedges; pen handles (knife, file and glasspaper); string winder and fishing line winder (four pieces of wood, halve joints near ends); auger-bit handle; whip handle and kite frame; wooden beads (dowelling wood bored with hot knitting needles, bead lengths marked off and made round by knife, file and glasspaper, then cut off and finished with lacquer, etc.); peg for slip rails and gate peg (knife work); model boat (square softwood, limb of pine tree shaped with knife, etc., gouged out first); 3-ply mechanical tops (fret-sawn); model of a house; model of a mine and windlass; model of a farm; blackboard duster (duster material fixed to board with glue, cement, or seccotine); aeroplane; toy stool; noughts and crosses board; toy arm-chair; match-box bracket; horse and cart; motor car; hobby horse; windmill (wood shaped with knife, arms made of tin tacked on); cricket bail (from $\frac{7}{8}$ -inch or $\frac{3}{4}$ -inch dowelling); set of wickets (shaped from hardwood sticks of correct size);



RUSTIC WORK AND WOOD JOINTS

propeller (shaped softwood or hardwood; canoe; egg-stand ($1\frac{1}{8}$ -inch holes bored in 3-ply, cleats screwed on for feet); seed-boxes; hose-stand (square stick sharpened one end, end bored, straight wire inserted and bent to carry nozzle of hose); simple soap-box; puzzle money-box; peg-box (tobacco or other boxes finished with projecting piece round top, mitred corners); pencil-sharpener (sandpaper glued or seccotined on piece of wood); stripping board or knife sharpener; knife-box; bread board (carved or chip-carved); teapot-stand (carved or chip-carved); boot-tidy; newspaper rest; clothes-line winder; tie rack; bill-file; pen-rest; bow and arrow; school-paper cover (3-ply, leather hinges laced to the 3-ply; envelope opener; book-ends; foot-rest; coat-hanger; broom-rack (dowelling in board); chicken-coop; wood-box; pipe-rack; hen's nest and perch; vegetable-box; ruler; stick for holding separator disks for washing; dinner-mats (3-ply and decorated); folding bath-mats (wood strips); Red Cross cabinet; rustic seat; sleeve-board; tie-board; stool; hat-rack; modelling-board; towel-roller; feed-box; walking stick; photo-frame; salt-box; book-shelves; milking-stool; dog-kennel; trolley; cart or truck; boomerang; crumb tray; paddle; fishing-rod; picture frame; Coolgardie safe; fire-screen; chess-board; cribbage-board; bridge-scorer; school apparatus; clock-case; pencil-case; bolted gate (single or double 3-inch by 1-inch hardwood bolted); folding hat-rack; portable brooders; barrow; handles for tools; garden stakes; egg boxes; fruit cases; window-box; plate-drainer; bird cage.

RUSTIC WORK

Fern Basket

The objects shown on page 81 are made from unshaped twigs and branches of trees. Carefully select twigs of a uniform thickness, and saw off pieces 15 inches long. Holes are bored 2 inches from the end of each stick with an $\frac{1}{8}$ -inch brace and bit or gimlet. Four wires are secured at the ends of two pieces of wood, which are placed parallel and 11 inches apart. Place two pieces on top, and at right angles to the lower ones, then thread the wire through the holes. Continue building the basket until the desired height is obtained. Bind the wires together, leaving a loop at the top. Wires are woven across the bottom sticks to form a base. The wire, which is used to bind bundles of pressed straw, will be suitable for the baskets.

Rustic Table

The top of the table is made of pine, with sticks about $1\frac{1}{2}$ inches to 2 inches in diameter for the legs, while the rails are about $1\frac{1}{2}$ inches in diameter. The legs are joined to the underneath surface

of the table by housing joints. The method of joining the legs and rails is shown in the diagram. The joints should be glued and nailed before placing the legs and rails in position.

Woodwork joints illustrated on this page are:—Dowelled joint (short lengths of dowels, forced into holes, which have been previously prepared, and then glued); housing joint; mitre joint (a dowel adds strength to this joint); cross-halving joint; tee-halving joint; barefaced tenon joint (this joint is used when the rail of a table is not as wide as the legs).

FRETWORK

Fretwork is a special branch of handwork, but may also be worked conjointly with other forms of handwork in the making of articles.

Tools and Materials—

A fretsaw frame, fretsaw blades, pliers, small drill or bradawl, cutting board, small screwdriver, sandpaper, and files.

Thin wood, 3-ply wood from cigar boxes, and thick strawboard are the chief materials.

General Directions

A fretsaw frame varies in size according to the span of the wood to be cut. It is governed by the distance from the saw blade to the end of the frame, which is usually 10, 12, or 16 inches, the 10-inch frame being a convenient size for small work. Blades are 5 inches long, and are sold in bundles of a dozen. No. 5 or No. 6 is a convenient size. To tighten the blade in the frame, first insert the saw blade in the top socket, making sure that the saw teeth point downwards; tighten the thumb screw first by hand and then with the pliers. Spring the frame together before tightening the other end of the blade. This gives a good tension. If a hole is to be cut in the middle of a piece of wood, first drill or bradawl a small hole near the edge of the part to be cut away, thread the lower end of the blade through, and then tighten the lower end of the blade (see diagram). The cutting board measures about 14 inches by 6 inches by 1 inch, and has a V-shaped cut in one end, the other end being held firmly to the bench with a cramp. Place the wood to be cut on the cutting board and allow the blade to work within the V-shaped cut (see diagram). Always keep the blade in a vertical position and hold the saw handle in the right hand with a fairly light grip. Cut away from the body, and endeavour to cut accurately along the line of the drawing. Do not force the saw, but allow the downward stroke to cut at its own pace. Be careful when turning a corner, and ease the blade until it is facing its new direction.

Set the drawing out very carefully on the wood, tracing it on with carbon paper or marking around a templet with pencil. Sometimes printed paper patterns can be obtained, and these are pasted on to the wood with clag or flour-paste. Study the grain of the wood before pasting on a pattern, keeping the drawing lengthways with the grain of the wood. Aim at economy of material. When the sawing is completed, remove the paper pattern with medium glasspaper, holding the work flat down on a bench, and stretching the glasspaper over a flat block of wood. Correct mistakes in cutting with a file. Colour toys with opaque water colours, paint, or lacquer, and finish off with a coat of shellac or varnish.

Designs can also be cut in thin metal, as copper, brass, tin, aluminium, etc. No. 2 saw blades are required. This work is termed saw-piercing. A fretsaw frame is used, and the same method is adopted in cutting out curves and small shapes in all materials. The making of a stencil plate is a form of fretwork, but in this case the cut-outs are not part of the design. It is only a means through which colour is applied to decorate articles.

Suggested Articles

On page 85 are shown some simple articles that have been shaped with the fretsaw. The watch-stand is made from the top of a cigar-box. The support is glued to the back, and a small hook added to complete the model.

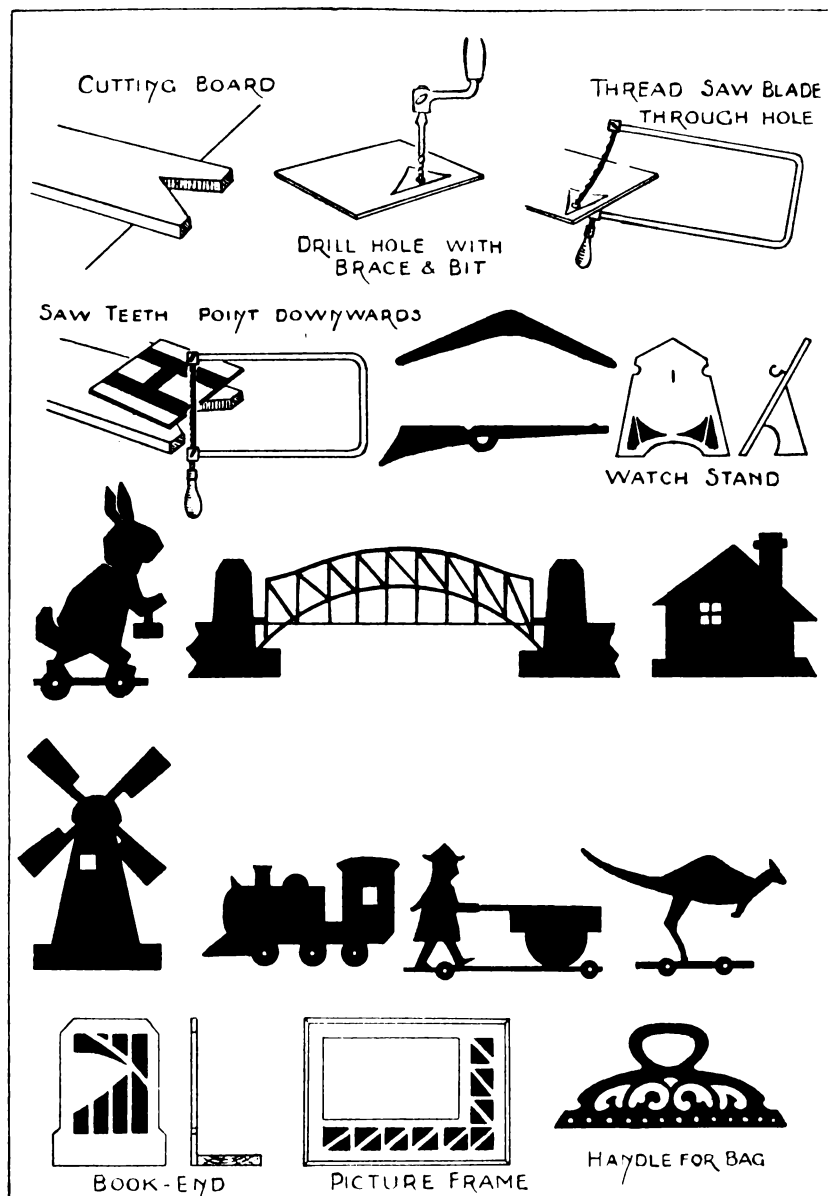
The toys are cut to shape and mounted on wheels, which are attached to a wood base.

The front and end elevations of a book-rest decorated with a geometric design are shown. Screw the face of the book-rest to the base and finish the model with a coat of varnish. If designs are cut with a fretsaw, they cannot be polished with a 'rubber'. In this case the varnish must be applied with a paint brush.

A picture frame, with a decorative border, is also shown.

A design for a handle, which is cut from thin wood or 3-ply, is illustrated. The handle is decorated, and will be found suitable for a stencilled or raffia handbag.

Following is suggested list of articles:—Luggage and plant labels; flower-sticks; brackets; wool or string winders; needle for net making; picture frame; pipe-rack; calendars (paste a coloured picture on 3-ply, and cut to outline); matchbox holder (method as for calendars); simple toys (animals, such as rabbit, bear, etc., cut to shape and mounted on wheels); tie-rack; Noah's ark and animals; dolls' furniture; clock case; jig-saw puzzles; mechanical tops, such as dancing sailor, jumping kangaroo, balancing horse, etc.; coat-hanger.



TOYMAKING

The Woodhound

Materials—

For the body, front legs, and tail, three pieces of pine 6 inches wide by 1 inch thick, and 7, 6, and 9 inches long respectively. For the head, one piece 4 inches by 3 inches by 1 inch; one $\frac{1}{2}$ -inch dowel, 14 inches long; four wooden wheels, 2 inches in diameter.

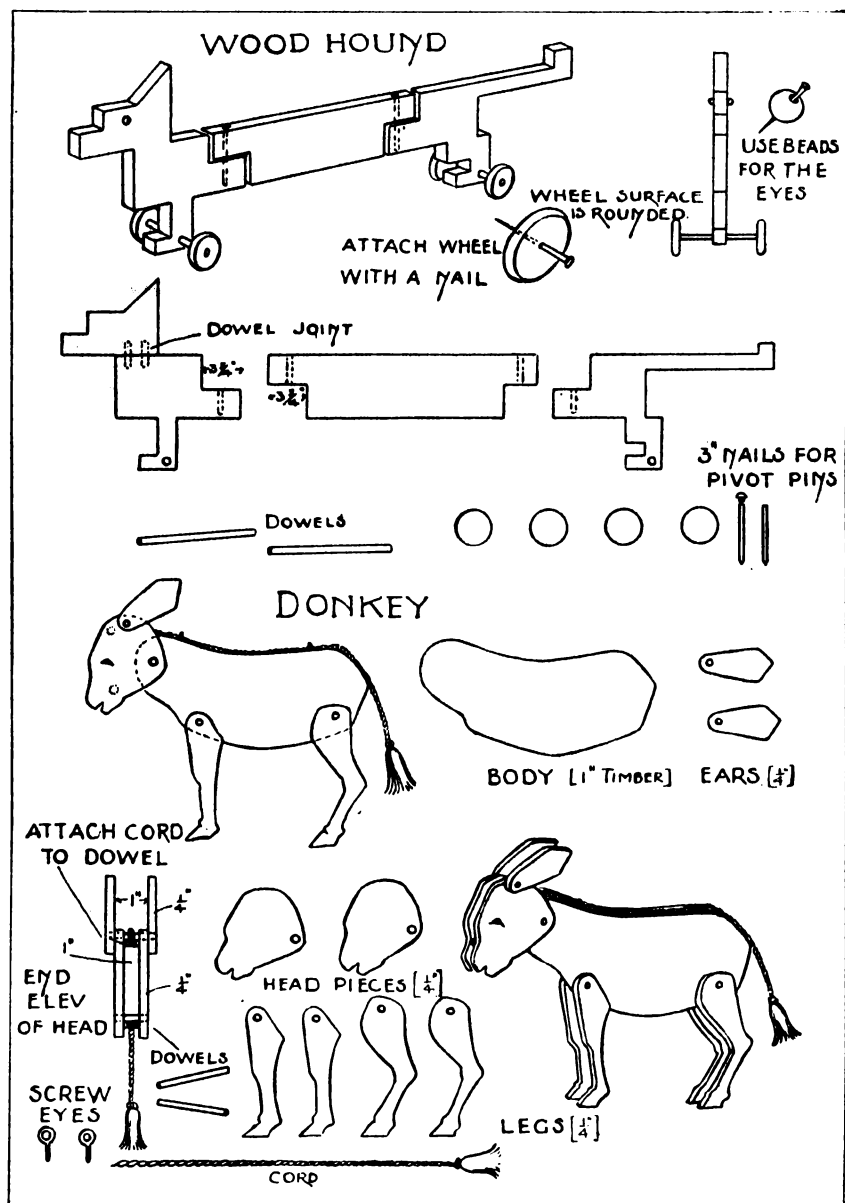
Prepare the outline of the sections on the material, and cut to shape with a hand saw. A lap of 2 inches is allowed at each joint, which is fastened by boring a hole and placing in it a 3-inch nail from which the head has been removed. The head is attached to the body by a dowelled joint. Holes are bored at the base of the legs, and a 7-inch length of dowel is pushed through, leaving a 3-inch projection on each side. The wheels are fixed to the axles by fine wire nails. [*Note.*—The wheel surface is rounded, so that the sections turn freely on the pivots.]

Two beads are tacked on each side of the head for the eyes. The model is painted or varnished, and a cord attached to the head.

Toy Donkey

In this model the head is pivoted to the body. The head is made to move by pulling the cord attached to it. In outline the body is in straight lines, with the legs and ears pivoted to the body and head respectively. The body is made from wood 1 inch thick; the head, legs, and ears are $\frac{1}{4}$ -inch to $\frac{3}{8}$ -inch thick. The patterns for the sections are given in the illustration; these are drawn on paper and transferred by tracing or carbon paper on to the wood. The body is cut to shape with a tenon or hand saw; a bow or fretsaw is used to shape the remaining sections. Join the legs on to the body, and one ear on to each section of the head. The two sections of the head 1 inch apart are then joined by two short lengths of a $\frac{1}{4}$ -inch dowel housed into each section (see diagram). The head is then pivoted on to the body. Two small screw-eyes are screwed into the back; a cord is threaded through them, and attached to the upper dowel just in front of the ears. A tassel is made at the end of the cord to represent the tail.

Many mechanical toys, representing birds, animals, and human beings, can be designed and made on the same principle as the toy donkey.



CHIP-CARVING

The term chip-carving, or incising, is applied to patterns with a geometric basis, in which the surface of the wood and the pattern chipped out are of equal importance.

The designs are based mainly on the square, triangle, circles, parts of these figures used singly or combined one with the other, to form geometric units. A few freehand curves are introduced for corner fillings. The success of the work depends on the exactness in setting out the patterns, and neatness in execution.

Much work may be done with an ordinary pocket knife, although there are special knives and chisels which are necessary to carry out some of the more intricate patterns. The models to be decorated should be constructed of soft, light, and close-grained wood, as kauri pine, yellow pine, poplar, etc.; cigar boxes are useful for chip-carving.

The cuts should be sharp and clean. Deep cuts should be avoided, and, if the chips are properly cut, they can be readily brushed out. Nearly all chip-carving consists of triangular 'pockets', each side sloping inwards at a uniform angle, which should not be greater than 45° , and having a depth graduated from the surface to about $\frac{1}{8}$ of an inch at the deepest point, the depth being governed by the nature of the design.

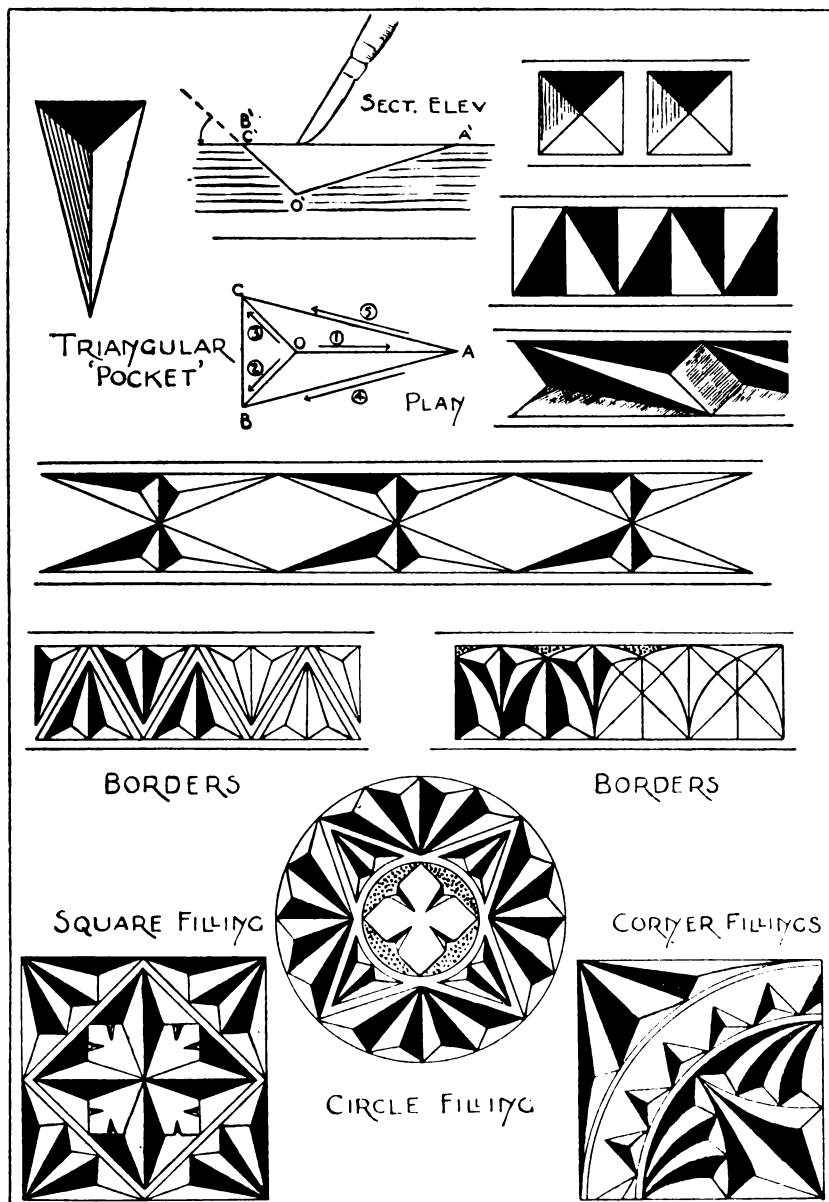
The illustration on page 89 represents a triangular pocket, shown by a sketch, a plan, and a sectional front elevation.

The first cut is vertical, in which the point of the knife is inserted at O and pressed down to the required depth (see sectional front elevation), and then drawn along the line OA until the point reaches the surface of the wood at A. This operation corresponds to setting down in ordinary wood carving.

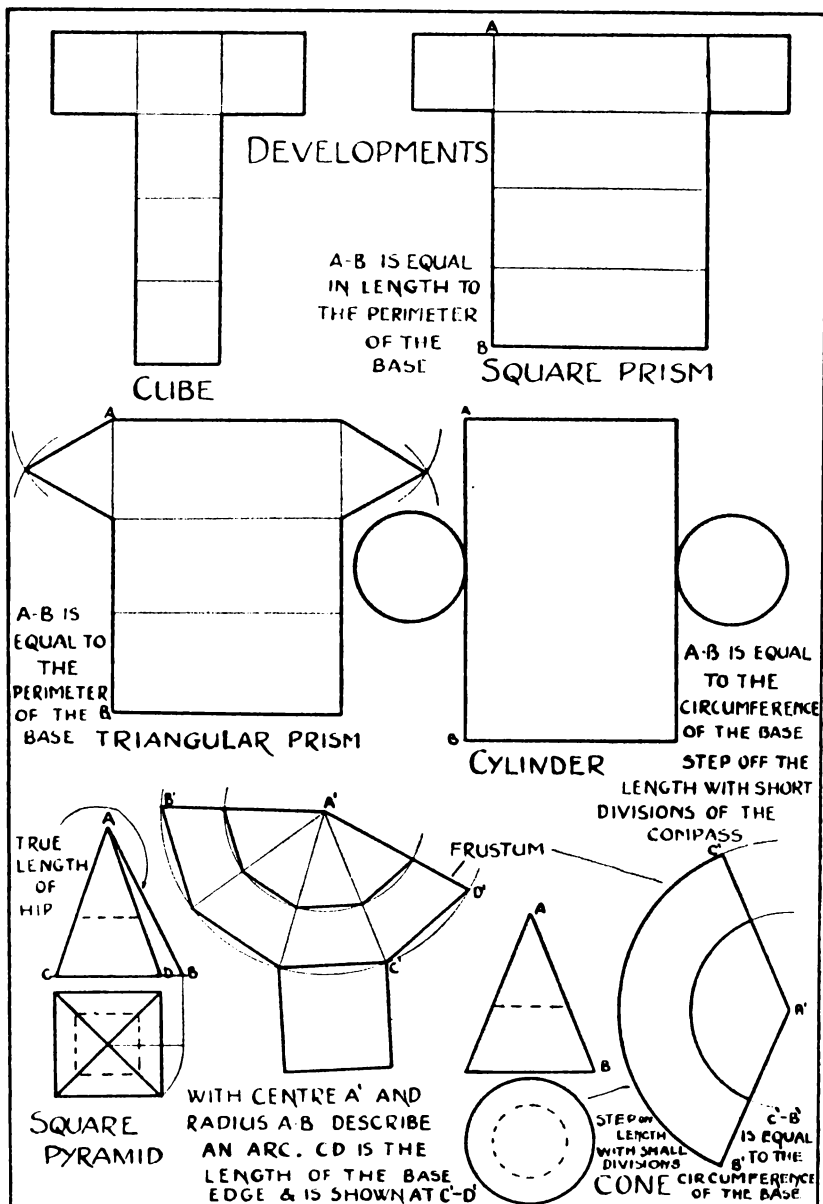
The next cuts, which are also vertical, are from O to B and O to C. In making the cut from A to B, the knife is held at the required angle, and is gradually pressed through the wood until it meets the base of the vertical cut. If the two cuts meet, the chip OAB will be free. This operation is repeated for the chip OAC, cutting from A to C. The last cut is to remove the piece OBC at the angle shown on the sectional front elevation.

Models, when carved, may be stained and wax polished, oiled with raw linseed oil, or finished with several coats of French polish applied with a brush.

Some designs suitable for the decoration of articles are also shown.



CHIP-CARVING



DEVELOPMENT OF OBJECTS

METHODS OF FINISHING TIMBERS**French Polishing—(Page 93)**

Some articles could be regarded as satisfactorily finished if left in their natural wood colour; others, according to the purpose for which they are intended, should be painted, stained, enamelled, wax polished, or shellac varnish (commonly known as French polish).

For French polishing the surface of the timber is smoothed down with fine glasspaper, and all dust and powder is wiped off the surface to be polished. Then with a soft rag wipe a little raw linseed oil over the surface, but the oil must be used very sparingly.

The next step is to fill the grain of the timber with a 'filler', which is composed of finely-crushed whiting, mixed with turpentine to a consistency of cream, to which colour (powder) is added if required. Take up a little 'filler' on a coarse rag, and rub it well across the grain of the timber. Care must be taken to see that the 'filler' is put on equally all over the surface (see diagram). Wipe off any surplus 'filler' on the surface, and put the timber aside for several hours to allow it to set. When the 'filler' is set, rub down the grain to a smooth surface with fine glasspaper (see diagram).

To Make Shellac Polish—

Place a quantity of shellac in a jar with a lid, or a bottle, and cover it with methylated spirits. Shellac can be bought in ounce quantities from hardware stores or paint shops. As shellac takes several hours to dissolve, it should be prepared beforehand.

Applying the Polish—

To obtain the best results, the work should be polished in warm weather, or in a warmed room. The polish is applied to the wood with a polisher's rubber, which consists of a piece of old linen, about 6 inches square, and a wad of cotton-wool is placed on top of the linen. The polish is poured on the cotton-wool, and the edges of the linen are gathered up into the fingers (see diagram). The under surface of the 'rubber' must be free of any creases. The polish must not be forced through the linen, but it must be allowed to soak out in small quantities. To cover the surface with polish, rub rapidly across the grain with moderate pressure, then in the direction of the grain. The next application is in a series of circular movements all over the surface (see diagram). While the 'rubber' is in contact with the wood, it must be constantly in motion. Do not leave it on the surface when stopping work. If the 'rubber' is inclined to stick, a little raw linseed oil should be applied—only a very little. The tip of the finger, moistened with oil, and touched on the 'rubber', is enough. Too much oil is

fatal, as the oil does not form part of the polish—it merely prevents the ‘rubber’ from sticking. As the ‘rubber’ dries, more polish is poured on the cotton-wool. Continue as above until a satisfactory polish is obtained. ‘Rubbers’ can be kept moist by placing them in an air-tight tin. A rag saturated in methylated spirits will remove the polish from the fingers.

An interesting feature about shellac varnish is that stain (colour) can be added, if the required colour is not obtained in the ‘filler’; thus staining and polishing may be done in the one application, if desired.

Polishing Wax

This polish is prepared by slicing beeswax and pouring turpentine over it, in the proportion of 1 part beeswax to 1 part turpentine. The mixture is heated, and stirred until it is thoroughly dissolved. When the polish is cool, it is applied to the surface of the wood with a soft rag or brush. Hardwood may be oiled a few times with linseed oil, preferably applied hot, and well rubbed with a soft cloth, or it may be wax polished. Both these methods give a dull polish, and little skill is needed to obtain a satisfactory finish.

Copal varnish can be used instead of shellac, but it has the disadvantage of taking 24 hours or more to dry, so that a room free from dust is needed. First close the pores of the wood with a paste (‘filler’). Glass paper after each coat, and then rub down with pumice powder made into a paste with either oil or water and applied on a piece of felt cloth. A good finish cannot be obtained unless the toolwork has been carefully done beforehand.

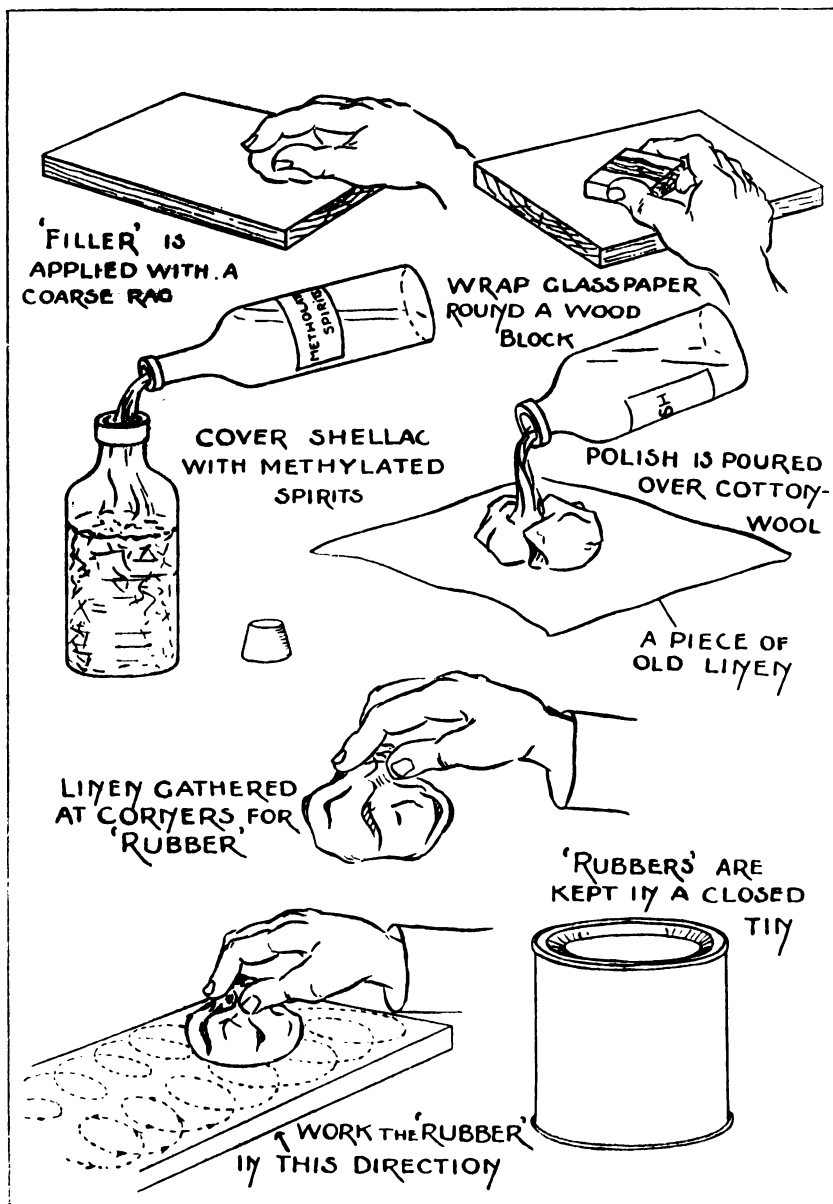
METHODS OF COLOURING WOOD

Pine and other softwoods may be stained by means of dry colour stains such as house painters use, mixed with boiled linseed oil and turpentine. Two colours may be mixed dry to obtain the desired shade, and the oil and turpentine added afterwards. Apply the stain with a piece of cloth, and, when dry, polish or varnish as above.

A solution of bichromate of potash turns oak a reddish-brown. It is yellowish when first dry, but if rubbed with an oiled cloth turns reddish in colour. A solution of ammonia washed over the surface will give an oak aged or grey appearance. The same stain will turn light mahogany to a rich red tint, adding considerably to its appearance.

When water stains are used, it is well to wet the wood first in order to raise the grain and then glasspapering the wood when dry.

Some of the models will be improved by a coat of enamel. A coat of thin glue size put on first will save much enamel by filling up the pores beforehand.



FRENCH POLISHING

WOOD STAINING

Suitable models in all shapes may be purchased. They should first be sized, then 'filled' with clear size (a glue preparation which can be bought in small packets at an ironmonger's shop). After the model has dried thoroughly, the design is drawn, traced, or stencilled on to the model, and coloured with Austral or other suitable tints. A coating or two of shellac and methylated spirits (French polish) or underlac is rapidly put on with a No. 8 or larger brush. When the work is dry, the article is French or wax polished. Black waterproof ink may be used for a dark background.

Following is a Suggested List of Articles—

Door plates with simple design, book-ends, door-steps, simple frames, work-boxes, letter-boxes, clock-holders, teapot-stands (wooden), dinner-mats, vases, wooden bowls, wooden beads (stained), stained paper-knife, fan (wooden), stained wooden trays, glove and handkerchief boxes of simple design, wooden book-covers, book-trough, dish-stands, designed wooden grip case, newspaper stand, picture-frame, stained wood and chain belt, fruit-bowls, wooden candlesticks, wooden lamp-shades, and jardiniere-stands.

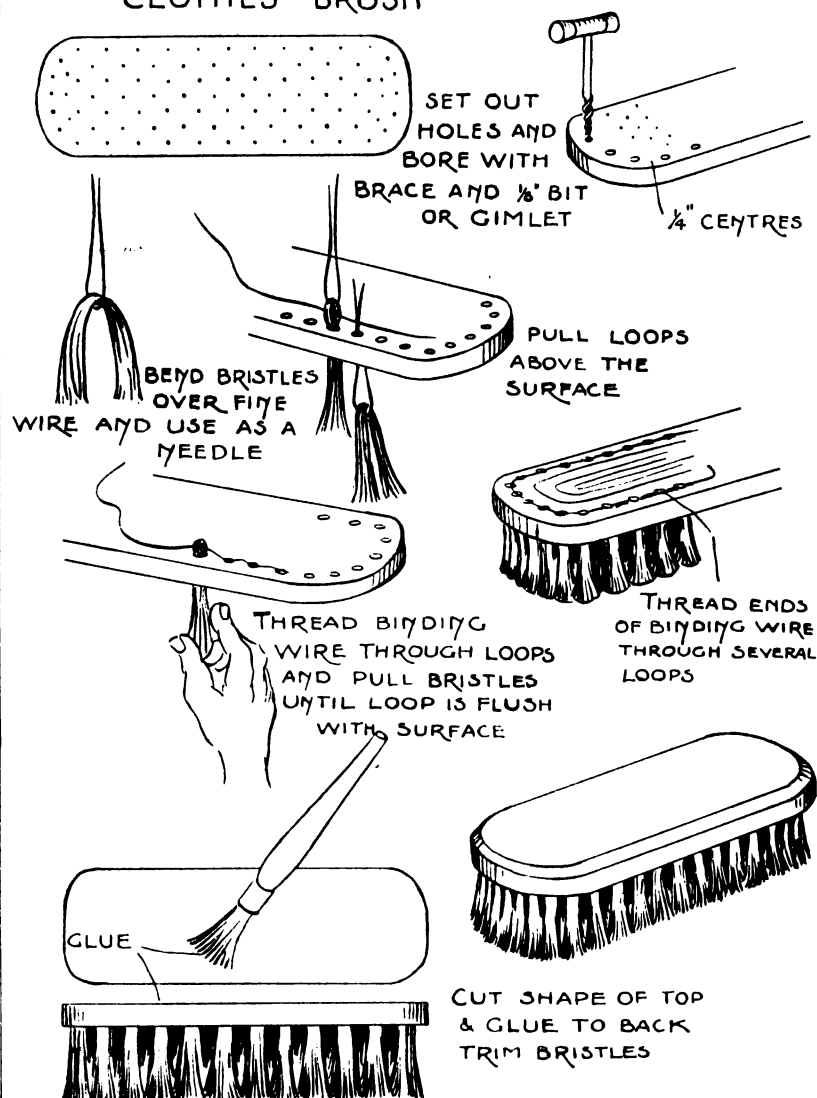
BRUSH MAKING

Materials—

A piece of blackwood, silky oak, or Queensland maple $\frac{1}{4}$ inch to $\frac{3}{8}$ inch thick, clean horsehair, fine strong wire.

On page 95 is shown a clothes brush. The shape and size of the brush will depend on the maker's requirements. Prepare the shape of the back and set out the position of the holes, which are $\frac{1}{4}$ -inch apart and $\frac{1}{8}$ -inch in diameter. Drill the holes with a gimlet or brace and bit; select enough hair for the bristles to agreeably fill a hole when doubled over and thread it through a short loop of fine wire, which takes the place of a needle. Thread the wire through one hole and draw the bristles up; remove the wire and thread the binding wire through the loop of the bristles above the upper surface. Make the end of the binding secure by threading it through several loops, otherwise the first bristles will fall out. Work one round of holes, allowing the loops to remain above the surface. Then pull each loop down level with the surface, as shown in the diagram. The binding wire should be kept taut, and not allowed to sag. Continue the process until all the holes are filled with bristles, and the loops are flush with the upper surface of the wood. The back of the brush is shaped and carefully glued to keep the bristles in position. Trim the bristles, and finish off the woodwork with French polish or clear varnish.

CLOTHES BRUSH



BRUSH MAKING

OTHER CRAFTS

LEATHERWORK

Materials—

Calf-skin, sheepskin, or suède leather, sharp knife, leatherwork tool, colours, leather punch, laces, sheet of glass and sponge for damping the leather.

Suède leather is lighter in weight than calf-skin or sheepskin, and will not stand embossing, i.e., modelling or raising the surface to give relief to the decoration by pressing on the back and front of the leather with a leatherwork tool.

Scraps of leather will be found useful for many small articles, such as book-marks, scissors-case, small table mats, and calendars, which are shown on page 97 and carried out in suède leather. Inquiries for scraps of suède leather from the local leather-bag manufacturers or boot factories may bring a cheap supply for these small articles. Calf-skin or sheepskin is too costly to buy in large quantities, but suède leather is much cheaper.

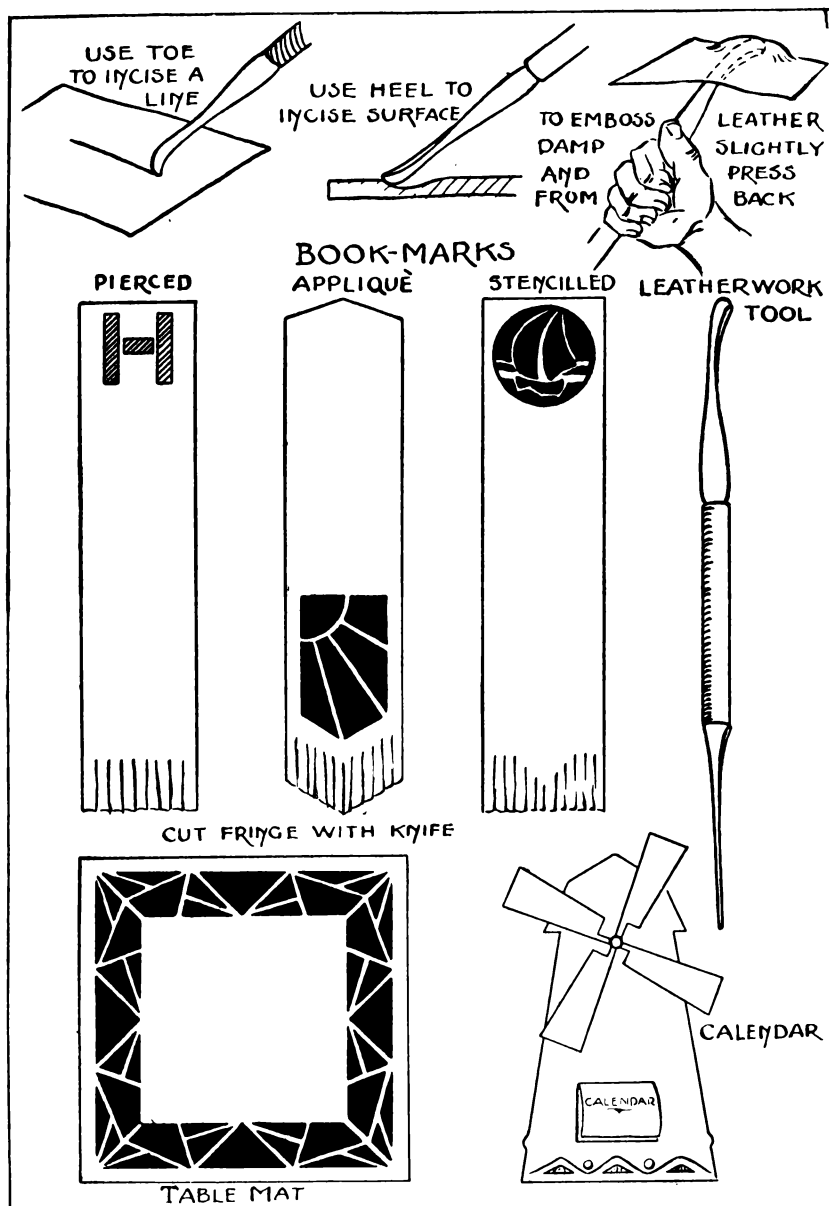
SUEDE WORK

The outline of the book-mark is set out and cut to shape with a sharp knife on a sheet of glass. The fringe is cut to provide decoration in addition to an initial letter pierced, i.e., cut out with the knife. All edges should be sharp and clean. The second book-mark on this page is decorated with a fringe and a geometric unit in appliqué. The small pieces of the unit are cut from coloured suède, which are attached by glue or seccotine and placed under a weight until set.

The other book-mark is decorated with a fringe and a small seascape, which is applied by means of a stencil plate, and coloured with water colours.

For the small table-mat the decoration is applied with a linoleum block print to form a border coloured with water or oil colours.

The outline of the windmill is cut out carefully and mounted on a piece of cardboard which is a replica of the suède windmill. The modelling tool is used to incise the outline of the blades on the surface of the leather. The border at the base is coloured. The small calendar is pasted on to complete the model.



LEATHERWORK

EMBOSSSED WORK

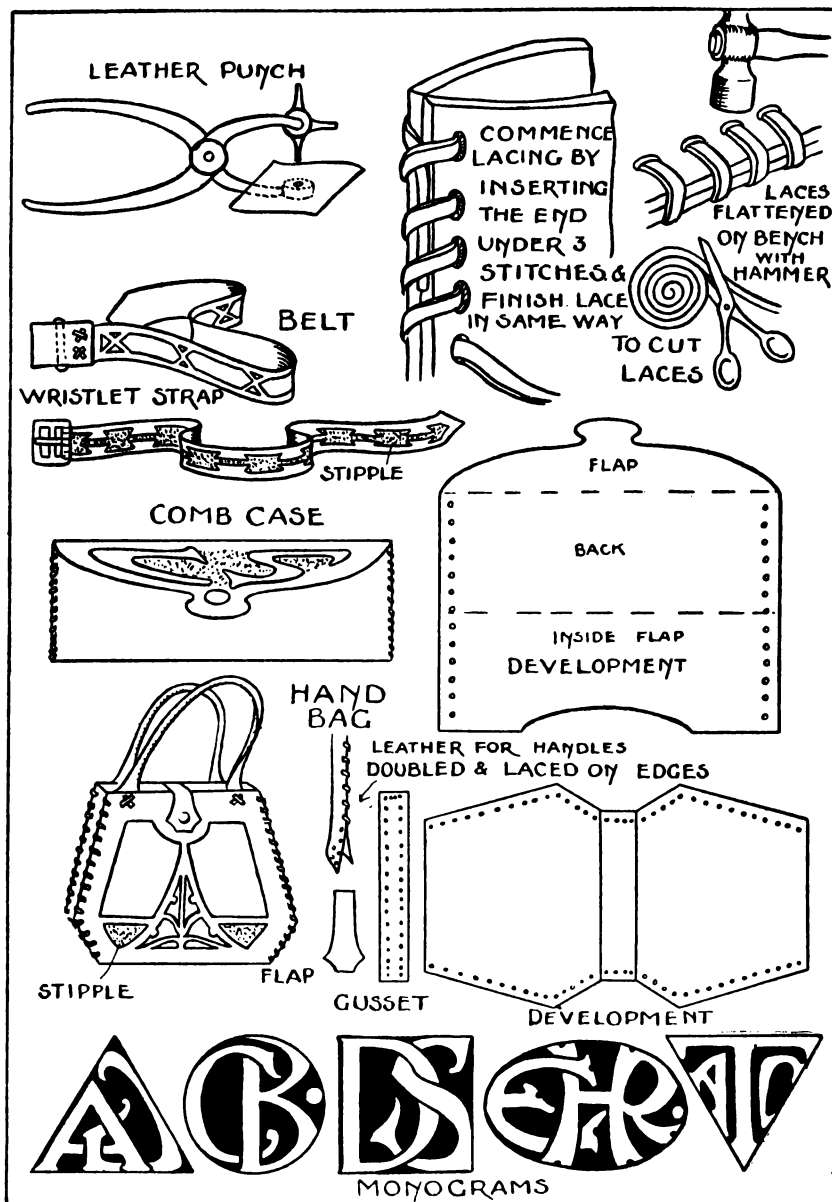
Calf-skin is the best leather to use for embossed decoration. Articles can be sewn or laced together. On page 99 the method of lacing near the edges is illustrated. First the holes are made with a leather punch about $\frac{1}{4}$ -inch from the edge of the material, and about $\frac{1}{4}$ -inch to $\frac{3}{8}$ -inch apart. The distance is determined by the width of the laces. To commence and finish lacing, turn the end under at least two or three stitches.

For the waist belt, set out the design on paper, then trace it down on to the leather with a hard pencil or the sharp end of the modelling tool, using a fair pressure to obtain an impression of the design in outline on the surface of the leather. The design will be more pronounced if the surface of the leather is slightly damped with a sponge and clean water. A simple strap-work design is incised on the surface with the rounded end of the tool.

The waist strap is made in the same manner. The buckles can be laced or rivetted on to the belt.

The development of the comb case and the design on the flap is traced on to the leather. The monogram is embossed by working down the background from the front and embossing the letters up from the back, after the leather has been slightly damped. Place the leather on a sheet of glass or tin when embossing. The stipple decoration around the initial letters is obtained by holding the leatherwork tool in a vertical position and stamping the leather with the pointed end of the tool. Punch the holes for the laces; fold the inside flap into position; commence lacing and add a small clasp to complete the case.

A small handbag is shown on the same page. The handle is made by folding over a piece of leather and lacing the two edges together, then lace on to the bag. Damp the gussets if they are too stiff to keep in position when lacing on to the sides of the bag.



WIRE WORK

Materials and Tools—

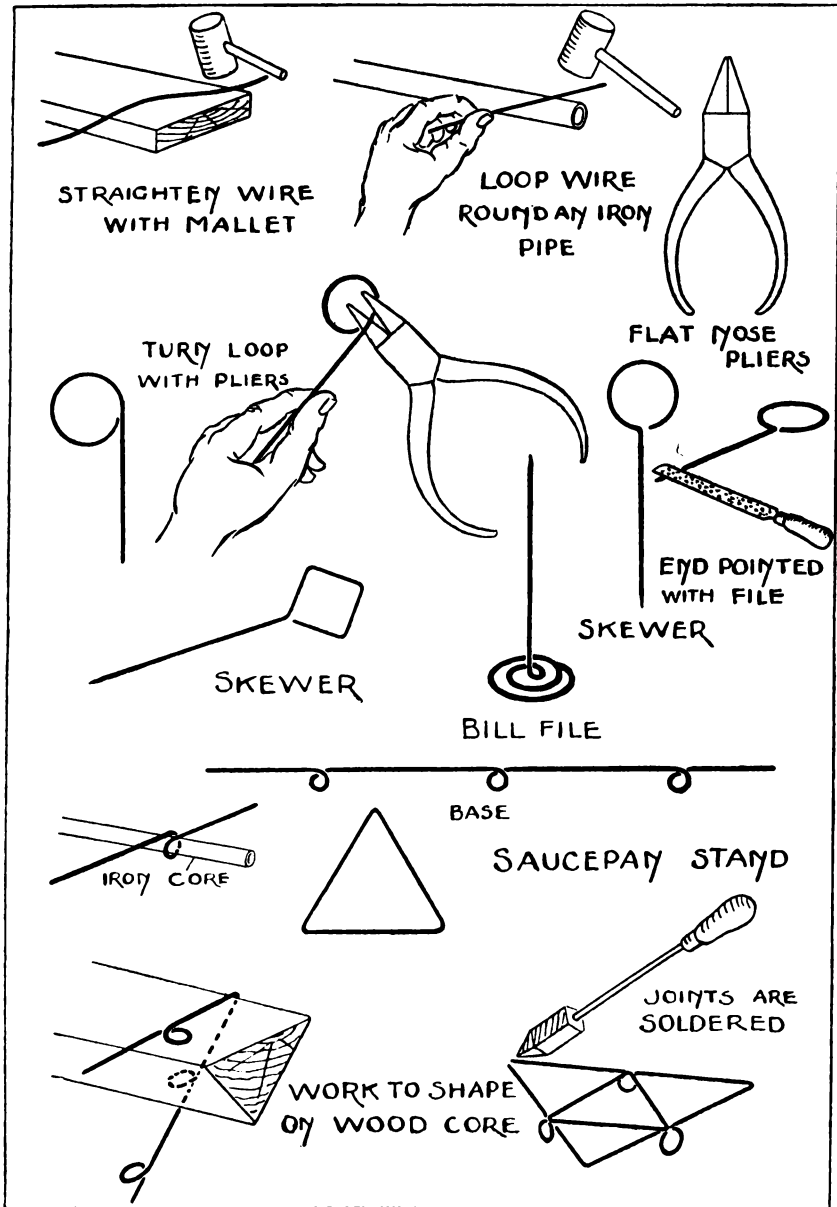
Pliable wire, such as fencing, copper, or galvanized wire, which may be purchased in any gauge or thickness to suit the models; solder and soldering irons, wooden mallets, round and square-nose pliers, tinsmiths' snips, files, wooden blocks, and short pieces of waste iron piping to be used as cores.

To make a meat skewer (page 101). Take a piece of 8-gauge galvanized wire 12 inches long, and with a wooden mallet flatten it on a piece of wood placed on the top of the bench. A short length of 1-inch water pipe is then held firmly on the bench or in a vice, and the circular loop of the skewer is beaten round the pipe with the wooden mallet. (Note.—Wire should be worked on a core at the required shape—iron or wood—with a wooden mallet, which will not make unnecessary marks and will not harden the wire to the same extent as an ordinary iron hammer.) Hold the end of the straight wire in one hand, and with the pliers, as shown in the diagram, turn the loop at right angles. Rest the end of the skewer on the bench, and file to a sharp point.

The skewer with a square top is made on a square core.

A small iron saucepan stand is shown on page 101. The stand consists of two triangular pieces of wire. Take a piece of wire, 21 inches long, and on it mark the three sides and the position of the three supports in the centre of each side. The supports are obtained by working the wire on a length of $\frac{1}{2}$ -inch water pipe as a core. Bend the wire with the pliers, or work it on a triangular core. The length of the smaller triangular shape is then determined and worked into shape. The stand is then ready for assembling the pieces together and soldering the joints.

How to solder:—Tin solder can be bought by weight in small or large quantities. The work to be soldered must be perfectly clean, i.e., free from dirt, rust, or grease. The units can be cleaned by scraping, by filing, or by rubbing with emery paper, and should be finally brushed over with 'killed' spirits. This acid can be bought in small bottles, already prepared, at an ironmonger's shop. Next, heat the soldering iron in a wood or on a gas fire, to not quite a dull red heat. If the iron is heated to a red hot heat, it must be cleaned, as an oxide scale forms on the surface. Therefore, to clean the iron, file the surface, while at a red hot heat, until the scale is removed and the surface is clean. Do not file too much, as the point of the iron, which is the soldering surface, will be worn away. Always keep a square



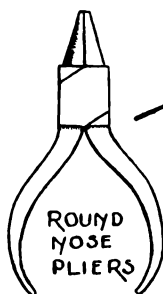
WIRE WORK

pyramidal shape at the end of the iron. While it is hot, dip it into 'killed' spirits, which has previously been poured into a small stone jar. If salammoniac is available, put the end of the stick of solder on it and rub the hot iron until it is covered with a thin film of solder. Pick up solder with the iron and apply on the joints. Remember the work *must* be clean and the iron hot to obtain satisfactory results. A cold iron is useless.

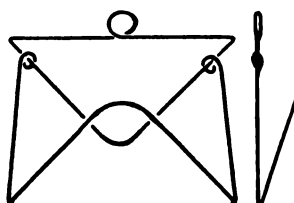
Butt joints in wire work should be avoided, as the area at the end of the wires is small, therefore overlap the wires or make a small loop at each end to give a greater holding surface to the solder.

The method for making a small loop with the round-nose pliers is shown on page 103. The joints must be carefully soldered, and if necessary the surplus solder can be filed off.

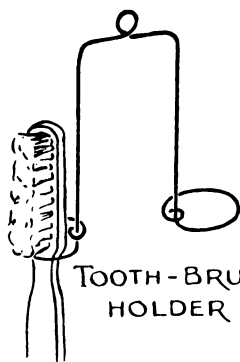
The letter file, tooth-brush holder, coat-hanger, soap drainer, toast rack and lamp shade are illustrated on page 103. The sections of the lamp shade are developed, then joined together with small loops and soldered. Use an 8-gauge wire for the lamp shade.



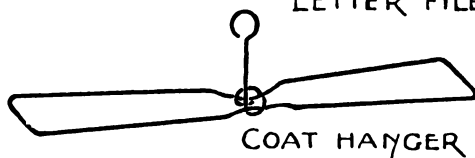
USE ROUND NOSE PLIERS TO MAKE SMALL LOOPS



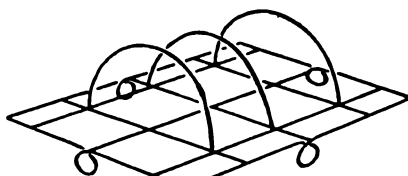
LETTER FILE



TOOTH-BRUSH HOLDER

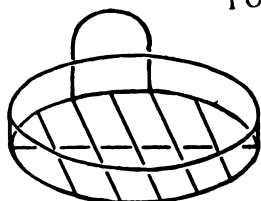


COAT HANGER

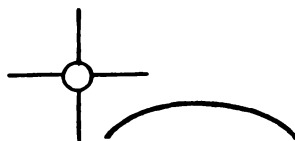
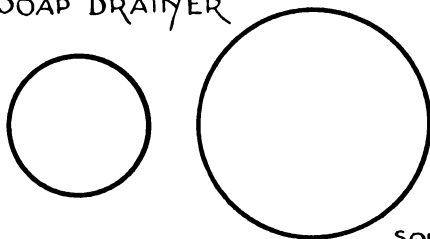
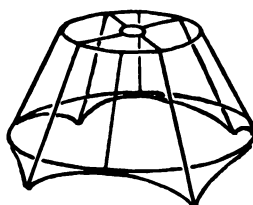


TOAST RACK

LAMP SHADE



SOAP DRAINER



SOLDER SECTIONS TOGETHER

WIRE WORK

SHEET-METAL WORK

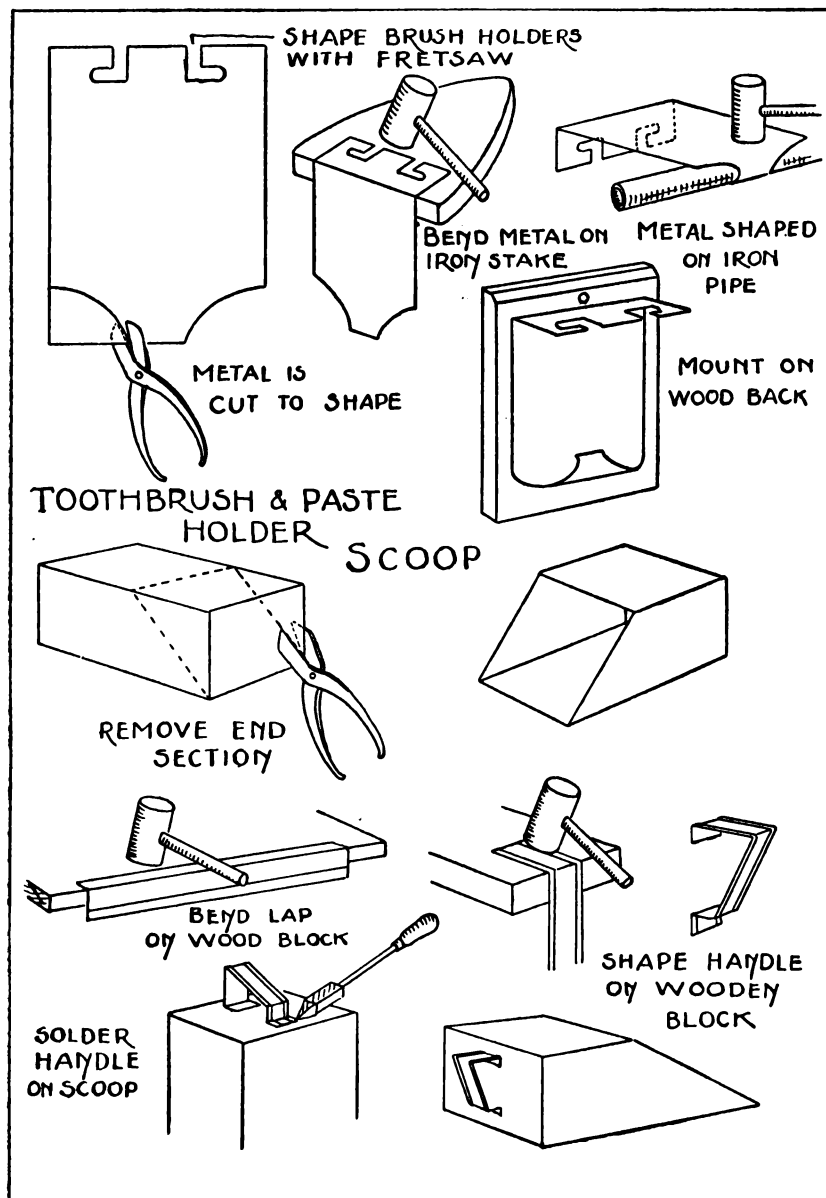
Tooth-Brush and Paste Holder

The illustration on page 105 shows a combination tooth-brush and tooth-paste holder. A piece of sheet tin, copper, or aluminium, $7\frac{1}{2}$ inches by $3\frac{1}{2}$ inches in size, is required.

On the metal draw the outline and cut out the brush holders with a metal saw and saw-frame; shape the ends with tinsmiths' snips. At a distance of $1\frac{1}{2}$ inches mark a line and turn this portion over at right angles on a 'stake' (an old flat-iron will be found useful) with a wooden mallet. Mark $1\frac{1}{2}$ inches from the lower edge and work over an iron pipe of 1 inch diameter with a mallet. Mount on to wood $\frac{1}{2}$ -inch thick, and drill a small hole so that the holder can be hung on the wall.

A Rectangular Scoop

A small scoop is shown on page 105. Select a cocoa tin, without the lid, and rectangular in section. At a distance of 2 inches from the open end, draw a line parallel to the long edges of the open end. At the extremities of this line draw two section lines to the end of the two lower long horizontal edges. Cut off this section with a pair of tinsmiths' snips. File away any sharp edges. A strip of sheet tin, which can be cut from the side of a petrol tin, 4 inches by $1\frac{3}{8}$ inches, is required for the handle. Set off $\frac{1}{8}$ inch on each of the 4-inch edges for the lap. Bend over the laps on a long stake with the wooden mallet, working along the whole length of the metal. Bend the lap over gradually— 45° from the horizontal, then 90° , then 135° , and finally beat down flat. The laps on each side of metal strengthens the handle and prevents it from cutting the fingers. On a small wooden stake and using the wooden mallet, shape the handle. Two small flanges, about $\frac{1}{8}$ inch long, are left at both ends of the handle, which is soldered to the scoop. The two flanges ensure strong soldered joints. (How to solder is described on page 100).



A Cylindrical Scoop

Materials—

A tin, circular in section, as a cocoa or salmon tin. A strip of sheet tin, which can be cut from a petrol tin, $3\frac{1}{4}$ by $1\frac{1}{2}$ inches, for the circular handle.

At a distance of 3 inches from the open end, draw a section line on the surface of the tin. Cut off this portion with the tinsmiths' snips. Turn over a $\frac{1}{8}$ -inch lap on each long side of the handle on a wooden stake. Use a $\frac{3}{4}$ -inch water pipe to round the handle; hold the joints together and solder firmly to the scoop. (See diagram.)

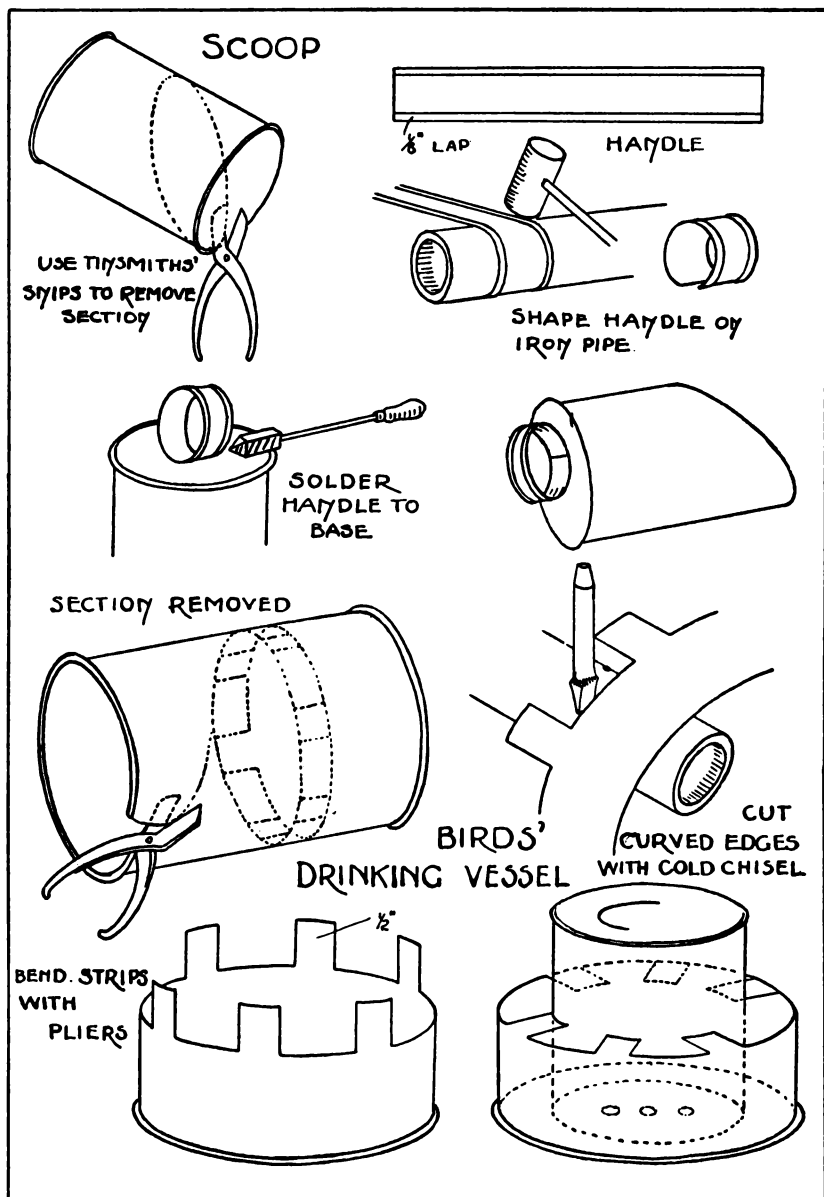
A Birds' Drinking Vessel

A drinking vessel for birds or chickens is shown on page 107.

Materials—

A large salmon tin, and either a preserved-fruit tin or a 6-lb. jam tin.

From the base of the fruit tin measure a height of 2 inches and draw a line round the surface parallel to the base. Determine the difference between the length of the diameters of the two tins, and draw a second line parallel to the first one at a distance equal to half the difference between the diameters. With the tinsmiths' snips cut off the unwanted sections of the first tin. (See diagram.) Between the two section lines mark off six $\frac{1}{2}$ -inch strips and cut down the vertical lines with the snips. As it is difficult to cut out the waste pieces with the snips, a cold chisel and hammer is used on a circular iron stake. If any rough edges remain, remove them with a file and finish with emery paper. Turn over the strips to a horizontal position with the pliers, so that they will allow the second tin to be placed in position. Near the top of the salmon tin punch a few holes to allow the water to percolate out into the outer tin. This water container will prevent the birds from falling or walking in their drinking water.



METAL WORK

A Paper Knife

Materials—

One piece of 20-gauge copper 10 inches by $1\frac{1}{2}$ inches, a planishing hammer, tinsmiths' snips, fretsaw frame and fine saw-blades, an iron 'stake' (a flat-iron which has been discarded from the home), an earthenware dish, and files.

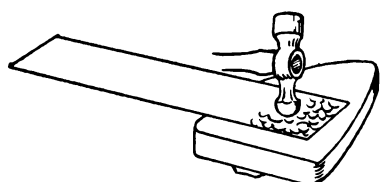
The whole of the surface is first hammer-marked with the ball of the hammer on the iron stake. Set out on tracing paper the shape of the outline and the decoration on the handle, and paste on to the under surface of the copper. Use the snips to cut out the outline, and punch small holes to take the fretsaw blade, which is employed to cut out the small units of decoration on the handle (see diagram). Remove the tracing paper. The paper knife is placed flat on the edge of the bench, and the edges of the blade are bevelled to a cutting edge.

Another method of decorating the handle is to etch out the units by means of a solution of equal parts of nitric acid and water, after the portion of the surface to remain has been covered with a coating of knotting or a mixture composed of equal parts of shellac and methylated spirits, which will resist the action of the acid. The mixture of acid and water is placed in an earthenware dish, and the handle is dipped in the mixture and allowed to remain until sufficient depth is etched in the handle.

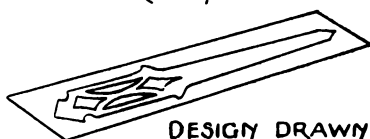
The article is now ready for oxidizing. Clean with a rag and fine sand or ashes, and place in a small earthenware bowl containing a small piece of potassium sulphide about the size of two peas dissolved in one quart of water. Colouration of the metal will take only a few minutes, therefore move the model about in the mixture, then remove it, and allow it to dry. If the colour is too dark, remove small portions of the colour with smooth and worn emery cloth. A polish consisting of beeswax and turpentine rubbed on the surface with a soft rag will give a bright finish.

To make the polish, place a piece of beeswax in a tin, place it over a slow fire for a few minutes, remove from the fire, then add turpentine. Allow the polish to set before using it.

PAPER KNIFE



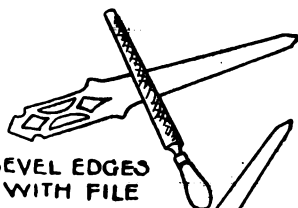
HAMMER-MARK METAL ON AN IRON STAKE



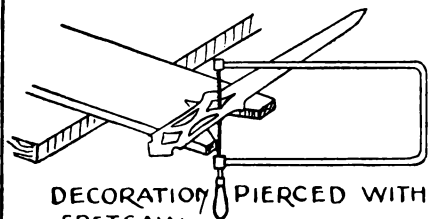
DESIGN DRAWN ON TRACING PAPER



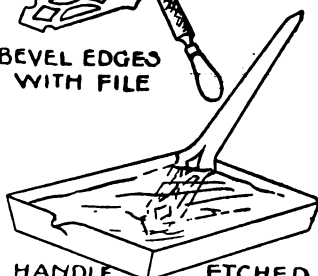
PASTE DESIGN ON METAL & CUT TO SHAPE



BEVEL EDGES WITH FILE

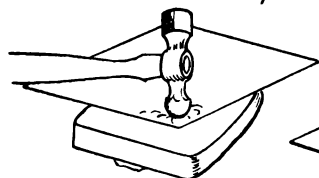


DECORATION PIERCED WITH FRETSAW

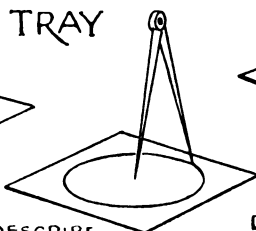


HANDLE ETCHED IN ACID BATH

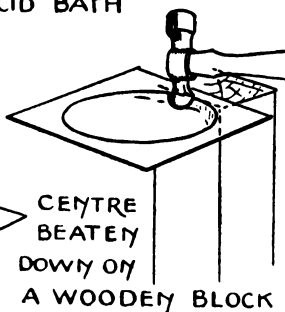
PIN TRAY



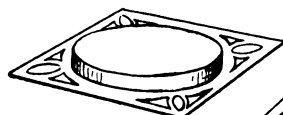
HAMMER-MARK METAL



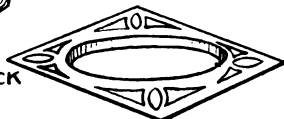
DESCRIBE CIRCLE



CENTRE BEATEN DOWN ON A WOODEN BLOCK



UNIT GOUGED OF WOOD BLOCK



UNITS DRAWN ON TRACING PAPER & PASTED ON MODEL FOR SAW-PIERCING

A Pin Tray

Materials—

One square piece of 22-gauge copper 4 inches square, dividers, and a short block of wood with sharp edges.

Hammer mark the metal as before, draw the diagonals to find the centre, and with the dividers set out a circle 3 inches in diameter. Place the metal on top of the wood block, with a point in the circle exactly on the edge, and beat the central portion down with the ball end of the hammer, moving the metal round as each blow is given with the hammer. Keep the depth of the central portion uniform. Rather than hammer one part to its full depth ($\frac{1}{2}$ inch) in one place, it should be taken down gradually around the circumference. Set out the decorative units on tracing paper, and paste them on to the back of the tray. Drill the holes and cut out with a fretsaw, or the small units can be embossed on a wooden block, after the shape of the units have been gouged out (see diagram). Clean and finish as described above.

A Small Bowl

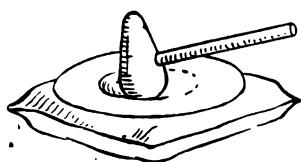
Materials—

A 'sand bag,' which is a leather or strong canvas bag filled with sand, short lengths of wooden blocks 4 to 6 inches square, a round wooden mallet, 2 planishing hammers, vice, earthenware bowl, and acid.

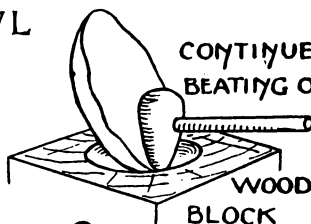
On page 111 a small fruit bowl is shown. Secure a piece of 20-gauge copper, 6 inches square. Draw the diagonals to find the centre, and describe the largest possible circle on the metal. Cut out the dish with the tinsmiths' snips. Hold the metal on the sand bag in the left hand and hammer lightly with the round wooden mallet, working from the centre in a series of spirals towards the outer edge. To give more depth to the bowl, gouge out a shallow spherical hole on top of the wooden block, and work around the metal on the block with the small end of the wooden mallet; continue this process on the wooden block with the ball end of the hammer, smoothing out any crinkles at the edge of the bowl (see diagram). The next step is to place the large ball hammer in a vice and smooth the bowl all over with the face of the other hammer which is slightly domed. The bowl is prepared for etching, then placed in an etching bath for the decoration on the surface.

For the finish, clean the model thoroughly, and oxidize it as explained before; then polish with a soft rag.

BOWL

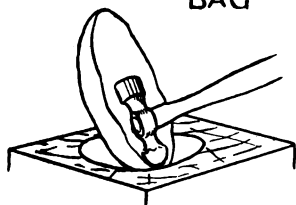


BEAT METAL ON SAND BAG

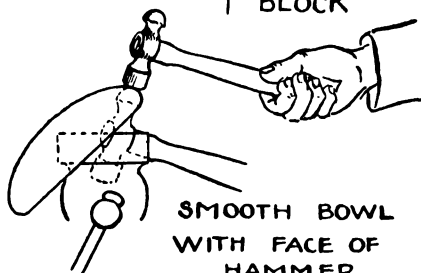


CONTINUE BEATING ON A

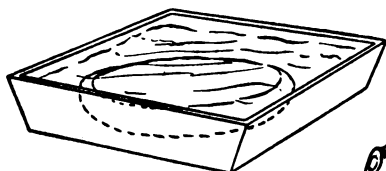
WOODEN BLOCK



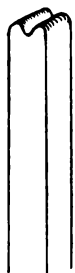
CRINKLES WORKED OUT ON WOODEN BLOCK



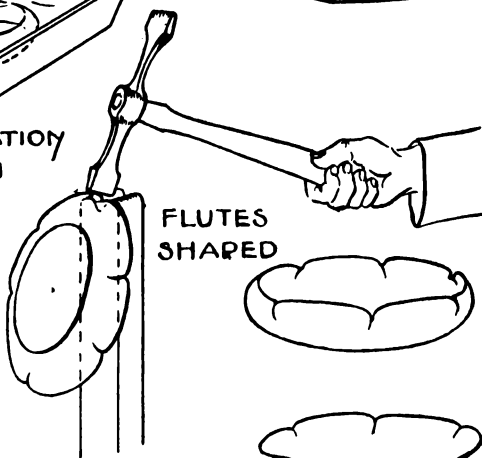
SMOOTH BOWL WITH FACE OF HAMMER



ETCH DECORATION IN ACID BATH



SHAPE WOODEN BLOCK FOR FLUTING



FLUTES SHAPED



FLUTED BOWL

Another form of decoration on a bowl is to show a fluted edge. Decide on the number of flutes, and mark their position on the edge. A wooden stake is shaped on the end (see diagram), and the bowl placed on top of the stake. With a raising hammer beat the edge of the bowl into the wooden stake, taking care to work the metal into the shape of the flute with light blows of the hammer, otherwise the metal, which at this stage will be very hard, will crack. If a blow pipe or some other means of obtaining intense heat is available, the metal can be returned to a state of softness by heating it to a dull red heat. This process is known as annealing, i.e., causing the metal to return to a state of softness after it has been hardened by continual hammering.

